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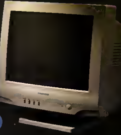

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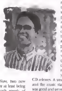
Dangerous times for Internet users

They say that in times of war it is when armies are advancing or retreating that civilians are in the most danger. While claiming that this is anything like a real war may be engaging in hyperbole, right now there is a real market confrontation happening between modem vendors promoting competing modem standards—and the stakes are high

Choosing the wrong standard could leave consumers with a slower semi-obsolete island of communications. For the vendors, it means the difference between continued aggressive competition and almost total market control

More speed required

At the recent Comdex/Pacific computer show in Vancouver, I had a chance to look at a variety of new competing telecommunication standards for hooking up computers to the Internet.



Is 56Kbps fast enough yet?

In the last 10 years, modem users have gone from data transfer rates of 300 bps to 1 200 bps to 2 400 bps to 9 600 bps to 14.4Kbps to 28.8Kbps to, briefly 33.6Kbps. Now, two new modem standards are emerging—or at least being promoted—in an attempt to reach speeds of 56Kbps Unlike the incremental 33.6Kbps modems being sold today 56Kbps is a significant improvement over 28.8Kbps modems. Viewing complex graphics or downloading sound files improves significantly with 56Kbps.

The modem experts keep telling us that we are about maxed out on improvements that can be thrown down regular telephone lines. The next improvement will have to come from the telephone companies, when they start laying down fibre-optic cables so we can have integrated services digital network (ISDN) access. The problem is that they are slow to implement this change and still charge a fair premium for the service. The nice thing about 56Kbps modems is that they will be sold by the vendors at the same price as 28.8Kbps modems are today and there is no requirement to purchase new telephone lines.

Hayes AT all over again?

This latest confrontation for modem standards harkens back to the Hayes AT command-set scuffle a few years back. The big difference this time around of course is the number of users affected. When Hayes was laying claim to the AT set, computing—and modeming in particular—was a rather limited activity Bulletin board systems and other online services were still very much a hobby item and the stakes were much lower. The World Wide Web was still a twinkle in Tim Berner Lee's eye. In the past two years, the market for both computers and modems has exploded, because users are seeing the Internet as an essential communications technology Many more millions of units are at stake.

The players this time round are US Robotics' X2 technology versus modems based on the Rockwell chipset—just about everyone else in the modem industry Rockwell calls their technology K56Plus.

According to Nick Tidd, director of Canadian sales for US Robotics, the company is ready to ship its X2 technology which requires a chip upgrade to recent modems. (Check with US Robotics about your particular modem, and when it was purchased. Some are upgradeable with FlashROM some require a chip upgrade and some are just plain un-upgradeable.)

This company is reported to be the single largest seller of retail modems in the world. It also owns the MegaHertz brand name which has the lion's share of the PC card modem market. These cards are used in many notebook computers.

US Robotics also has strong links to the Internet service provider (ISP) community In its attempt to gain marketshare, it claims to have lined up a large number of national and regional ISPs to support its technology

Rockwell for its part lays claim to over two-thirds of the world's modems. In its advertising, Rockwell also claims to have lined up large numbers of ISPs on its side Rockwell's K56Plus technology is apparently still a few months away from shipping. Upgrade options will also vary

Never enough

While the current battle for supremacy between modem vendors is what will affect most users in the next two years, I saw an even more interesting technology on display at the Comdex show. The technology is called asymmetric digital subscriber line (ADSL), which separates the existing copper telephone line into three "channels" a downstream (i.e., to us customers) channel which claims to offer 2 Mb to 6 Mb per second transfer rates, a duplex channel, and a third POTS (plain old telephone service) channel. The modems for this technology are still quite expensive I heard one quote of $800 for an internal PC card. The demo I saw was of a record company's Web site where you could log onto and sample its CD releases. A small video window would pop up and the music started playing. The sound quality was good and promises a much improved multimedia experience for future Internet users.

This technology is currently available in Saskatchewan and Alberta. BC Tel is testing ADSL currently but is hesitant about the technology The best thing about it is that consumers can use a regular telephone line, and theoretically at least, pay no higher rates to their phone company

ADSL seems like it will help if it is implemented at a reasonable price point. What you really want though, is another technology I saw at the same BC Tel booth, capable of delivering 10 Mb per second downloads. This is serious bandwidth. This is the equivalent of having firehose pressure coming out of your showerhead Overkill for most, but I know of a few gamers and Web surfers who would love this kind of bandwidth. The dream of infinite bandwidth goes on..

Telecommunications speeds

The past	
	300 bps
	1 200 bps
	2 400 bps
	9 600 bps
	14 400 bps
Current speeds	
	28,800 bps
	33 600 bps
X2 or K56Plus	56,000 bps
ISDN single channel	64,000 bps
ISDN two channels	128,000 bps
ADSL (one way)	2,000,000 bps
What we really want	
10 Mb/sec	10,000 000 bps

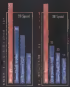
A time for peace

Stop dreaming, these technologies are still esoteric, and are not going to be available to the mass market for the next little while whereas 56Kbps is the current issue. It is time that Rockwell and US Robotics worked out an equitable solution to keep all brands of modems working together and let the public move forward in their purchasing plans End the uncertainty and find a solution that allows both camps to remain viable In the meantime, buyer beware Find out which technologies your ISP is planning to support before buying new modems or hooking up to a service.

Enjoy the issue

Douglas Alder
Editor/Publisher

Speed Versatility Upgradeability



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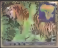

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Windows 95. Creative 3D Blaster PCI was configured with 4 MB of [illegible]
[illegible] under Windows 95. Microsoft [illegible] screen 640 x 480 resolution [illegible] color [illegible] refresh rate based [illegible]

Apple of my eye

Yes it's that time of year again Apple hunting season I've already encountered about 10 Apple doomsayers who squawk "Apple's dead! Apple's dead! It's dying! Look! It's stock price fell another 1/16th!"

Call me crazy but the last time I checked, Apple was doing fine Sure it lost some money this quarter but whose fault is that? I'd say it would be the Apple doomsayers, who stand in department stores keeping everyone away from that new Performa 6400/200

But have you guys caught "Apple Doomsday Fever" yourselves? It seems like you are only devoting about 1/100th of your paper to Macs even if all of the latest breakthroughs have come out of Apple Take your recent review of notebooks—I must have searched for half an hour for a mention of Apple's new Powerbook 1400 which your article did not feature.

Windows CE arrives—marvelous breakthrough What about Apple's new Newtons including the eMate 300, that new Newton for classrooms?

Intel's new processors reach 200 MHz. Wow, Macs have been enjoying 225 MHz for about half a year now and we'll soon have 300 MHz, and the finally 500 MHz Apple's dead for sure see what I mean?

I'd like to say to anyone who's considering buying a Mac that I use my family's Performa 6200 CD almost every day while my own Windows 3 1 computer in my room works great—as a clock.

Patrick Cameron

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Apple of my heart

In reply to Stacey Man Woh's letter (see TCP Mailbox Feb '97):

Well here I am with a six year old Macintosh IIsi 17 MB of RAM 80 MB hard drive with a 3x CD-ROM drive and ZIP drive Works fine for me!

QuickTime VR? Sure, go ahead 320x200x256c What? Quicktime movies? Yeah, of course! I can play 160x128 windows with 22KHz sound no prob

What? You need that MS word DOS-disk? Stick it in my disk drive double click ClarisWorks comes up converts it and voila all formatting, fonts, etc Oh you need to save that back to MS-Word format? Sure save as. MS-Word

Need to expand? Plug the scanner/CD-ROM/Zip drive into the SCSI drive use SCSIProbe or FWBMounter to mount it

Customization? Sure I got sand-dunes for wallpaper, Aaron changes my windows and my trash can is a BeBox icon Animated hard disk icon

Total cost for my computer $400 for the CPU, 17 MB RAM and 80 MB hard drive Apple extended2 keyboard and mouse $169 for my NEC Multisync monitor, $120 for my NEC 3x SCSI 2 CD ROM drive (all bought about a a year and a half ago) and $220 for my SCSI Zip drive

Lets see what I can do with this piece of plastic and metal ...I took a test drive at Photoshop and ...

Take a look at what you can do with Photoshop and a 1990 68030-20Mhz machine (http //www baloo com/scbc)

The FirstClass BBS at TVOntario is running of a Quadra950 Nope not even PowerMac!

Phil Pang, Toronto

Apple over ripe

I'm getting sick and tired of hearing all of the complaining and belly aching from your OS/2 and Mac readers. Why don't they face up to the fact that they are on the losing end of their hopeless battle

We've all seen it before, the PET was "better" The Atari was "better" the Amiga was "better" Guess what better" means nothing if the product is not being supported by the majority of the public or it is being mismanaged by the people who market the product

For nearly two decades I was buying the "better" anything, regardless of what the majority had picked I eventually learned my lesson When I finally decided to drop my last "better" system I decided to stick with the majority I bought a PC with anything that was popular loaded. I have not been let down advice is plentiful publications are overwhelming, support is easy to find and merchandise is everywhere

I bought a Pentium when it became popular I got Windows95 because it was popular I buy only best selling software and I'll stick with Netscape until it becomes number two (then I'll switch to Microsoft Explorer but not a second before it becomes number one)

As for your OS/2 and Mac readers I suggest they jump ship before they become as pitiful as the Atari and Amiga owners who are still out there complaining

As for the loyal OS/2 and Mac users who would rather go down with the ship, I hope they get the whole thing taped on their Beta Camcorder

Gary Carlos

Mail service overstated

In the What's New section February edition of *The Computer Paper* The Electric Mall company (EMC) received a mention titled "Electric

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LETTERS

Continued from page 8

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Clay Brazilier representing EMC

Blame it on the year I lost in the '70s

I'd like to start off saying I enjoy reading your publication, and I squeeze all the information I can from it, storing what I can in my brain.

But... looking at your front cover and seeing your "10th anniversary", as well as reading the article by David Tanaka with the graphic "10 Years Later", I did some math of my own. No matter how many ways I sliced it, I could only come up with nine years! I'm no rocket scientist, or a scientist of any kind, but I did graduate, and there on my diploma was printed Math 12. I must have done some arithmetic in school—and 1988 was still only nine years ago.

From my way of thinking, your first anniversary would have been in 1989, since your first issue was in February 1988. Thus following that trend, your second anniversary would be in 1990, third in 1991, and so on. That would leave 1997 as the ninth anniversary, and 1998 as the 10th.

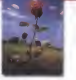
Cheers, Dale Tudge

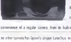
DT (chronologically challenged) replies: That was our 10th February issue, and we are beginning our 10th year of publication, but you (and a few others who have written in) are absolutely right—the 10th Anniversary issue will not be until Feb '98.

A rose is a rose is a...wait a second.

Kodak DC-40 Digital Camera

Casio QV10 Digital Camera


EPSON PhotoPC 500 Digital Camera



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YOU'VE GOT TO SEE IT IN EPSON COLOUR.

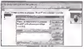
These photos were taken with the Kodak DC-40, Casio QV10 and EPSON PhotoPC 500 as configured for retail sale. No special effects or lenses were used. Awards given to the EPSON PhotoPC, the first in the line of Epson color digital cameras. EPSON is a registered trademark of Seiko Epson Corp. ColorTrue and ClearOptics are trademarks of Epson America, Inc. All other trademarks are the property of their respective owners. © 1996 Epson America, Inc.

Microsoft launches Office 97

BY JEFF EVANS

On Jan. 16 Microsoft founder and chief executive officer, Bill Gates, delivered a keynote address in New York to signal the official introduction of Microsoft Office 97 Simultaneous launch ceremonies were held that same day in Toronto and New York, marking the official start of a 30-city North American tour to promote the new version of the world's most popular business applications software suite. Over 500 000 shrink-wrapped copies of Office 97 had been pre-ordered by retailers by the time of the launch, plus another three million Office 97 licences for corporate network clients.

Earlier versions of Microsoft Office have attracted a user base of over 55 million people so eventual sales of the new product which runs on Windows 95 or Windows NT may eventually run to the tens of millions of copies Microsoft conducted exhaustive user surveys when designing and testing the new suite, involving interviews with more than 5 000 people over 1 000 on site visits to user installations and 25 000 hours of usability testing of the new product while in development Among the major changes in Office 97 are a high degree of integration with the Web (in the form of a Web browser style of user interface and approach to searching for resources and viewing files), and easy hyper text markup language (HTML) publishing capability



Word's automatic grammar/spelling checker found two of three mistakes in the sentence When you make a error in grammar Word 97 will informs you of the mistrake.

Office 97 includes significantly improved versions of its traditional applications, including MS Excel, MS Access, MS PowerPoint, and MS Word. A major new application is Microsoft Outlook desktop information manager "a powerful new means for users to manage information, track documents and communicate with others. Integrating email scheduling, contact management task management and a journal module for tracking documents and events, Outlook operates as the central hub' of activity for Office 97 users," according to Microsoft

According to Gates, "Our investment in understanding the needs of customers and our continued ability to deliver exciting enhancements are the cornerstone of Office's ongoing success. Customers will be very pleased with the Internet integration, the new collaboration capabilities of Outlook 97 and IntelliSense technology featured in the Office Assistant "

The Standard Edition of MS Office 97 is shipping, with a list price for new users of $689 The upgrade price for registered users of earlier versions of the office suite is $294 The competitive upgrade price for users of other vendors suites is $349 A Professional Edition of Office 97 is also available, for $829 to new users $434 to registered users and $489 as a competitive upgrade A Small Business Edition of Office 97 is expected to be available this month with pricing similar to the Standard Edition According to Microsoft a Developer Edition will also ship this month ❑

Contact: Microsoft Tel 905-568-0434
Web site: http://www.microsoft.com/office/

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Acer buys Texas Instruments notebook business

BY BOB WOODS

DALLAS (NB)—Texas Instruments is selling its mobile computing unit to Acer. The Acer Group's Acer America Corp. has signed a definitive agreement to buy TI's mobile computing business for an undisclosed amount. Acer will purchase and use the names of TI's TravelMate and Extensa product lines.

Already, Acer makes and sells its own AcerNote Light and AcerNote Nuovo notebook lines, and currently makes most of TI's Extensa notebooks. Acer also expects to gain a substantial number of TI's mobile computer division's employees when the deal is expected to close before the end of this month. Acer plans to combine the mobile computer division's sales and marketing force with its own worldwide computer business efforts, officials said.

Stan Shih, Acer Group chairman and chief executive officer, said he thinks TI's mobile computing management can enhance his company's US and worldwide efforts to gain market share. In addition, Acer hopes to make bigger inroads into the corporate business market through its selling of notebook computers. Acer offers business PCs, servers and components, in addition to its well-known line of Aspire home PCs. Acer officials added they think today's acquisition will improve their rankings as the world's seventh largest PC brand and fourth largest PC manufacturer.

TI officials said they were shedding their mobile computer business to "accelerate our corporate focus on digital signal processing (DSP)." While with TI, the mobile computing division grew "dramatically in a very competitive environment over the past two years," said Tom Engibous, TI president and chief executive officer. But figures released a day after the announcement show revenues from TI's mobile computing segment were lower than a year ago.

Acer and TI have already worked together in other projects, including the manufacturing of dynamic random access memory (DRAM) chips through TI-Acer Inc., headquartered in Taiwan. Earlier in January TI said it would sell its defence systems and electronics businesses to Raytheon. TI said at the time the division was not as profitable as its other subsidiaries.

Separately, TI said it lost (all figures in US dollars) $29 million or $0.15 per share in the fourth quarter, compared to earnings of $291 million or $1.50 a share in last year's fourth quarter. Revenues were also down to $2.46 billion from $3.14 billion in the year ago period. For the 1996 fiscal year, net earnings totaled $63 million or $0.33 a share, down from fiscal 1995's profit of $1.08 billion or $5.63 a share. Revenues were down to $9.9 billion from $11.4 billion. Fourth quarter income from discontinued operations totaled $11 million or $0.06 per share, versus $23 million or $0.12 per share from the same period a year earlier.

Fiscal 1996 from discontinued defence operations were at $109 million or $0.57 per share, as opposed to $92 million or $0.48 per share in fiscal 1995. Excluding discontinued operations, loss per share in fourth quarter was $0.21 versus profits of $1.38 in last year's fourth quarter, and fiscal year 1996 loss per share was $0.24 from a profit of $5.15. In addition, 1996 fourth quarter and fiscal year results include several one-time charges and asset write-downs ❑

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Texas Instruments, Web site http://www.ti.com
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Apple lowers prices on computers and servers

BY PATRICK MCKENNA.

CUPERTINO Calif (NB)—Faced with a flood of negative ink after losing more than two percent of the personal computer marketplace last year, Apple Computer Inc announced price cuts for certain Power Macs Performas, Unix-based Network Servers and Macintosh operating system-based workgroup servers.

The current round of cuts announced in early February run as high as 27 percent.

Computer industry analyst and publisher of the *California Technology Stock Letter*, Michael Murphy, said, "This is a good move for Apple. They have to move inventories to make room for new products and, after a disappointing 1996 holiday season those inventories are higher than they expected."

Entry level Performas are reduced about US$100 and more advanced Performas are reduced as much as US$400 For Power Macintosh customers cuts range from US$250 on an entry level 7200 to US$1 200 on a multiprocessor Power Mac 9500/180

Apple cut US$200 to US$600 from the current costs of various Workgroup servers and as much as US$3,500 from its top AIX based Network Server.

Power Computing, the first Macintosh clone manufacturer, may have influenced Apple's current reductions Making good on his promise to move his company's Mac clones, Power Computing's chief executive officer Steven Kahn is shipping aggressively priced Macintosh OS-based systems ❑

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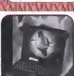

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WHAT'S NEW

Riding the Internet wave puts US Robotics on a US$1billion roll • Pioneering modem manufacturer US Robotics has recently turned into one of the most obvious winners in the Internet boom, with sales of nearly US$1 billion in 1996 that are expected to double in 1997 and continuing large shares in many telecom hardware categories. The company has stayed on top of the competition with a succession of new products that keep up with the demands of a frantically developing telecommunications market.

"Best known for our modem solutions, we have built on our core DSP technology to create advanced products that enhance personal and professional communications," a company statement reports.

The US Robotics line now consists of much more than traditional internal and external modems for individual PC users. A large part of the company's business now consists of Enterprise Access products, including the new Total Control Edge Server Card an "Intranet and remote access solution that integrates server functionality communications interfaces and the high performance capabilities of Microsoft Windows NT on the Enterprise Network Hub."

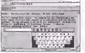
Other high-end products include Network Hubs dual T1 card sets, modem pools for small offices, LAN switching hubs and 10Base-T and 100Base-T switched LAN cards. End user products continue to include the popular Sportster line of modems, plus new high-speed products such as the Courier I and DataBurst ISDN products. The US Robotics PC Card modem line includes the top of the line 33.6Kbps Megahertz PC cards for Apple and Windows notebooks.

US Robotics' handheld organizer, the Pilot, has achieved great popularity in its initial release, but this compact computing platform has been designed for further development to a powerful Internet-capable communications system, and major enhancements to it can be expected in the first half of 1997.

As well, at the recent Comdex PacRim show US Robotics showed its new videophone product a low-cost, simple to use product intended for the home user. According to Nick Tidd, the long-time head of US Robotics' Canadian Megahertz branch, "We have to reinvent ourselves every day. If we ever started to take things for granted that would be when our competitors would catch up."—JE

Contact: US Robotics Tel. 906-336-8168.
Web site http://www.usr.com

Chinese language email, Web browsing • Zi Corporation of Calgary has developed a number of applications based around its simplified Chinese character input system called Zi Input.



The system uses only 10 keys on a basic English language-style alphabetic keyboard and follows the stroke order that Chinese students learn in school. The system is also intelligent, as with each key stroke, it narrows the field of possible characters to include only the most frequently used characters beginning with that stroke displayed on the screen. According to the company, this allows any of the 50 000 Chinese characters to be entered with an average 2.7 keystrokes.

Zi Input is the core technology underlying the company's Internet software suite which includes Zi Browser and Zi Mail. Zi Browser lets users view and input Chinese character-based and English languages on the World Wide Web and on Intranets. Zi Mail is an Internet-based electronic mail product that allows the exchange of English and Chinese character-based messages between users of the Internet and across Intranet environments.

According to Zi Corp. this allows different language groups to communicate, regardless of the type of computer platform used.

Zi Corp. was formerly known as the Ziron Group. It has offices in Calgary, Beijing, Hong Kong and San Francisco.—DT

Contact: Zi Corp. Tel 800-750-7731 Web site http://www.zicorp.com

SoftSearch aims to provide guide to all the world's software • Ever hear of an interesting piece of software and then suffer the frustration of not being able to track it down? Or, have you ever had a need for a program that could perform a particular job but been unable to locate any currently available product that met your needs? Well SoftSearch "the Software Information Service," has existed since 1989 just to answer such questions.

Software Information Service

SoftSearch

Currently more than 115,000 software titles from over 20 000 developers reside on its database. For a $60 fee an individual can gain access to this archive via the Internet and do a self directed search. Or, for $90, a consultant will conduct a search for the customer.

The database of software has search fields that help to guide the user through categories such as operating system industry platform developer name location price and capabilities. Although the service doesn't claim to have a complete listing of all the world's current software it is the closest to a complete catalogue that exists, and it is continually being expanded.

"The growth in the number of packages available represents a huge increase in both the number of developers and the amount of commercial software available," according to Kathy Woolverton, president of SoftSearch. Customers of the service have included Kodak, Digital Equipment the Mayo Clinic and the Los Angeles County Bar Association.

At the recent Comdex PacRim 97 show in Vancouver, other companies exhibiting at the show were invited to add new product information to the database and to verify the currency and accuracy of listings already recorded.

SoftSearch is a division of Synergy Computer Consulting Ltd a Vancouver based software developer. Synergy also operates a subsidiary named OpenRoad Communications which does Internet and Intranet design and development.—JE

Contact: SoftSearch Tel. 800-667 8503 or 604-681 0516 Web site http://www.softsearch.com

miro DC30 for the Mac • One of the semi-secret glories of the Windows PC in the last couple of years is that it has actually—finally—become a half decent platform for digital video production, threatening to displace the two other personal computers, the Amiga and the Mac which pioneered "desktop video" in the late 80s and early 90s respectively.

The high-speed PCI architecture of the PC, in particular, made the creation of high performance graphics and video cards more technically feasible. Since Apple began shipping large numbers of PCI-equipped Macs in late 1995 many of the better PC graphic card makers have performed the relatively simple task of writing Mac driver software for their Windows PCI products. The result has been a welcome stream of high-powered, attractively priced new graphics hardware for the Mac user community.

The latest and most notable product in this trend towards "Mac izing" the best PC products is the new Mac version of the miroMOTION DC30. Announced at January's Macworld Expo in San Francisco, the Mac version of the DC30 is a full-featured video capture, editing and effects system. Its PCI bus mastering "delivers studio-quality video and CD-quality audio with data rates up to 6 MB/sec. The editing solution also includes real time video overlay video editing acceleration, and CCIR 601 support," according to miro Computer Products.

The DC30 can process video data at rates up to 6 MB/sec., with 4:2:2 YUV TrueColor support and Motion-JPEG compression up to 3:1. The top quality of video output from the DC30 system is claimed to be "studio quality" (i.e., not at the absolute highest of current broadcast quality but fully acceptable for most other commercial video markets, such as industrial and cable video, and computer multimedia).

The DC30 supports both North American (NTSC, 640x480) and European (PAL, 768x576) video resolutions. An excellent feature of the product is the capacity to deliver lip synchronization of speech with motion via on-board CD-quality audio support. The DC30 comes with a full version of Adobe Premiere and Kai's Power Goo SE for special effects and morphing. The miroMOTION DC30 will be available in Canada in the spring for a list price of about $1 300.—JE

Contact: miro Tel 800-249-6478
Web site: http://www.miro.com
Forefront Graphics, Tel 416-638-4444

120 MB LS-120 floppy drive goes into high-volume production • The LS-120 diskette drive a new floppy drive format jointly developed by a group of companies including Compaq, Mitsubishi Electric, Hitachi-Maxwell and Matsushita-Kotobuki Electronics Industries is now being manufactured in large volumes (expected to reach half a million per month by mid 1997).

Imation a subsidiary of the 3M company that was spun off as an independent entity manufactures diskettes for the new drive and is actively promoting it in North America.—JE

Why yet another drive format? • Although about 80 million of the familiar 3.5-inch high density floppy drives are manufactured annually the small 1.4 MB capacity of the traditional high density diskette has fallen far behind the needs of many PC users for transportable mass data storage. The LS-120 drive was developed to meet the need of PC users for a drive that is compatible with 1.44 MB floppy diskettes, but which can also be used to store much larger amounts of data on a diskette. The LS-120 will store up to 120 MB of data on a special diskette while still reading and writing 1.44 MB diskettes.

"In the past few months we have seen strong developments supporting LS-120 technology as the new standard in high-capacity diskette technology," according to Ray Meifert, director of Imation's PC Market Segment. The firms that sponsored the development of the LS-120 are also sponsoring a multi million dollar international marketing campaign to raise awareness of the new drive and to encourage its adoption. Compaq began to offer a variety of PC models equipped with the new drive in 1996 and expects to expand availability of the LS-120 through 1997.

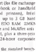
A low-profile version of the drive, for use in notebook computers, is expected to be released any week. The most prominent BIOS suppliers, including Phoenix Technologies, Award Software International and American Megatrends, have all announced support for the LS-120 which will make it easy for purchasers of new PCs to install and use the new drive. A FloppyMAX ATAPI controller card from Promise Technology is available to allow most older PCs to accommodate an LS-120 drive.

The mass storage market which has seen a proliferation of different products in the last few years, has grown quickly in response to the need to store new kinds of very large files (such as graphics, digital audio and digital video) at a reasonably low cost. The problem with all the new formats (such as floptical, CD-R, PD/CD etc.) is that any given format may become obsolete and unsupported fairly quickly. The hope with the LS-120 is that its backwards compatibility with the 1.4 MB floppy diskette, and its relatively high storage capacity and low cost will combine to give it a degree of long term appeal to PC users.—JE

Contact: **Imation**, Tel. 888-326-7756
Web site http://www.imation.com
Compaq, Web site. http://www.compaq.com
Megatrends, Web site http://www.megatrends.com

NEC debuts desktop PCs and notebooks with MMX • At the Comdex PacRim show NEC Computer Systems Division rolled out MMX equipped versions of its Versa 6050 multimedia notebook, the 6050MX, and its PowerMate P2200 with MMX. The Versa 6050MX has a "swap out" 10x CD-ROM drive, 12.1 XGA or SVGA display two PC Card slots, lithium-ion battery integral 33.6Kbps modem, hardware MPEG digital video support and 16-bit SoundBlaster audio.

Versa 6050



Powermate P2200

The NEC PowerMate Performance Series with MMX is a line of business desktop PCs that, in addition to MMX Pentium 166 or 200 MHz processors, offers ATI Rage 64-bit accelerated graphics, 12x CD-ROM drives, built-in IrDA-standard infrared port (for file exchange with IrDA-equipped notebook or handheld PCs, and IrDA equipped printers), Intel LANDesk client manager up to 3 GB hard drive, 16 MB or 32 MB EDO RAM 256KB cache and NEC Magic Eye and McAffee anti virus software preinstalled, plus a three-year limited warranty with 24-hour corporate technical support.

According to tests with the standard benchmarking software (BAPCo SysMark 96 Ziff Davis Winstone 96, and Norton SI32), even when running standard non-MMX optimized software the new MMX processors perform 15 percent to 20 percent faster than older Pentium chips of the same clock speed. When running MMX optimized multimedia applications MMX chips can achieve speed increases in multimedia related functions of up to 60 percent.—JE

MIPS out, Intel in • NEC which achieved some early success with workstations and servers powered by MIPS RISC chips (Microsoft did most of its early development of the NT operating system on NEC MIPs computers) has retired the MIPs architecture from its server line, in favor of industry standard Intel processors.

Continued on page 24

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- ESS 1868 16bit Sound Card
- 15" Tower Case w/230watt
- Keytronic Win 95 Keyboard
- SP-Pro 260 Stereo Speakers
- Genius Mouse w/Pad
- Windows 95 Release 2.0
- Microsoft Plus! Package
- Built-In Video Card
- Monitors Sold Separately

$1649

[illegible] PENTIUM/133 MPC-3D

- 256K Pipeline Burst Cache
- 16MB EDO 60ns SIMM RAM
- 1.44 Panasonic Floppy
- 1.7GB Fujitsu Hard Drive
- 12X Panasonic CD ROM Drive
- 33.6 USR PVI Internal Fax/Modem
- Tower Mouse 32 P&P Tower Card
- 19" Tower Case w/230watt
- Keytronic Win 95 Keyboard
- 60watt Tower Speakers
- Microsoft "J" Mouse w/Pad
- Windows 95 Release 2.0
- Microsoft Plus! Package
- Matrox Mystique 2MB Video Card
- Monitors Sold Separately

$2249

EXPRESS MICRO PENTIUM/200 3D-CAD

- 256K Pipeline Burst Cache
- 32MB EDO 60ns SIMM RAM
- 1.44 Panasonic Floppy
- 3.5GB Quantum Hard Drive
- 16X Tatung CD ROM Drive
- 33.6 Internal Fax/Modem
- Sound Mouse 16 P&P Sound Card
- 19" Tower Case w/230watt
- Keytronic Win 95 Keyboard
- SP-Pro 260 Speakers
- Genius Mouse w/Pad
- Windows 95 Release 2.0
- Microsoft Plus! Package
- Matrox Mystique 2MB Video Card
- Monitors Sold Separately

$2949

[illegible] PENTIUM PRO/180

- 256K Pipeline Burst Cache
- 32MB EDO 60ns SIMM RAM
- 1.44 Panasonic Floppy
- 3.2GB Quantum Hard Drive
- 16X Tatung CD ROM Drive
- 33.6 Internal Fax/Modem
- Tower Mouse 32 P&P Sound Card
- 19" Tower Case w/230watt
- Keytronic Win 95 Keyboard
- SP-Pro 260 Speakers
- Microsoft "J" Mouse w/Pad
- Windows NT 4.0
- Microsoft Plus! Package
- Matrox Millennium 4MB Video Card
- Monitors Sold Separately

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- 160MHz PowerPC 603e Processor
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180MHz	200MHz
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[illegible] TOWER SYSTEM

- 160MHz PowerPC 603e Processor
- 32MB RAM (Expandable to 160MB)
- 256K Level-2 Cache (512 Optional)
- 2.5GB Internal Hard Disk Drive
- 8X SPEED CD ROM Drive
- 1.4 Floppy Disk Drive
- Motorola 28.8 Data/Fax/Modem
- 1MB VRAM (expandable to 4MB)
- ADB/PS/2, SCSI, Stereo 16-bit Head Phones/Microphone & 1 Serial Drive
- Keyboard & Mouse included
- Monitors Sold Separately

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180MHz	200MHz	200MHz
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STARMAX 4000 [illegible] DESKTOP SYSTEM

- 160MHz PowerPC 604e Processor
- 16MB RAM (Expandable to 160MB)
- 512K Level-2 Cache
- 1.2GB Internal Hard Disk Drive
- 8X SPEED CD ROM Drive
- 1.4 Floppy Disk Drive
- 2MB VRAM (expandable to 4MB)
- ADB/PS/2, SCSI, Stereo 16-bit Head Phones/Microphone & 2 Serial Drive
- Keyboard & Mouse included
- Monitors Sold Separately

$3149

Starmax 200MHz

$3549

STARMAX 4000 [illegible] TOWER SYSTEM

- 160MHz PowerPC 604e Processor
- 32MB RAM (Expandable to 160MB)
- 512K Level-2 Cache
- 2.5GB Internal Hard Disk Drive
- 8X SPEED CD ROM Drive
- 1.4 Floppy Disk Drive
- 2MB VRAM (expandable to 4MB)
- ADB/PS/2, SCSI, Stereo 16-bit Head Phones/Microphone & 2 Serial Ports
- Keyboard & Mouse included
- Monitors Sold Separately

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Starmax 200MHz

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[illegible] FENGARI - 3D SERIES

- Quantum Fireball 2.1 GIG EIDE Mode 4 Drive
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- 16550 UARTS & EPP Port
- INFRA-RED Port Technology
- 2 Universal Serial Bus Ports
- 19" Diamond II Case w/200 Watts
- 1.44 Panasonic Floppy Disk Drive
- Fujitsu 8725 Win 95 Keyboard
- Microsoft "J" Mouse w/Mouse Pad
- Panasonic 8X CD ROM
- Sound Blaster 16 P&P Sound Card
- Windows 95 Release 2.0
- Encarta 97 • Works 95 • Money 95
- MS PLUS! • Creative Writer
- School Bus to Flat Solar System
- 60 Watt Stereo Speakers
- 33 6 A-OPEN SVD Voice/Fax/Modem

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PENTIUM/150
[illegible]
$2699

PENTIUM/166
[illegible]
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PENTIUM/200
[illegible]
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[illegible] ASTERI - 3S SERIES

- 2.1 GIG Quantum Fireball SCSI III Drive
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- Matrox Millenium 2MB WRAM
- 17" Optiquest V775 .26 Monitor
- ADAPTEC 2940UW SCSI ULTRA WIDE
- INFRA-RED Port Technology
- 16550 UARTS & EPP Parallel
- 2 Universal Serial Bus Ports
- 19" Diamond Tower w/200 Watts
- 1.44 Panasonic Floppy
- Fujitsu Win 95 Enhanced Keyboard
- Panasonic 12X CD ROM Drive
- Sound Blaster 32 Sound Card
- Microsoft "J" Mouse w/Mouse Pad
- 3D FX Software Package
- Nascar 3D Racing Game

OPTIONS

Deluxe Sound System w/Sub Woofer	$199
Windows 95 Release 2.0 & MS Plus!	$149
Windows NT 4.0 Full Version	$329

PENTIUM/133
[illegible]
$3599

PENTIUM/150
[illegible]
$3699

PENTIUM/166
[illegible]
$3899

PENTIUM/200
[illegible]
$4099

PENTIUM PRO 180
$4399

[illegible] ILIOS - CDR/GS SERIES

- 4.55 GIG Quantum Atlas Ultra Wide SCSI Drive
- 64 MB EDO RAM 60ns 72 Pin SIMM
- Matrox Millenium 4MB WRAM
- 17" Optiquest V775 .26 Monitor
- ADAPTEC 2940UW SCSI ULTRA WIDE
- INFRA-RED Port Technology
- 16550 UARTS & EPP Parallel
- 2 Universal Serial Bus Ports
- 29" Diamond Tower w/250 Watts
- 1.44 Panasonic Floppy
- Microsoft Natural ERGO Keyboard
- Plextor 12X SCSI CD ROM Drive
- Sound Blaster 32 Sound Card
- Microsoft "J" Mouse w/Mouse Pad
- 3D FX Software Package
- Nascar 3D Racing Game
- Windows 95 Release 2.0
- JVC 2X/4X CD ROM Burner w/Software
- Deluxe Stereo Sound System w/Sub Woofer

PENTIUM/133
[illegible]
$6149

PENTIUM/166
[illegible]
$6449

PENTIUM/200
[illegible]
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PENTIUM PRO 180
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NOTEBOOK RAM
ONLY $160!!

PVT/M NOTEBOOKS W/PENTIUM ® PROCESSOR (8 MB, 10" DSTN CLR)

Hard Drive	810 mb	1.3 gb	2 gb
PVT/M P-75	$2653	$2815	$3187
PVT/M P-100	$2726	$2940	$3180
PVT/M P-120	$2787	$2981	$3221

PENTIMEDIA/CD NTBKS (8 MB RAM 11.3" DS CLR), TFT +$200

Hard Drive	810 mb	1.3 gb	2 gb
P 75 Intel Pentium	$2784	$2970	$3190
P 100, Intel Pentium	$2834	$3038	$3268
P 120, Intel Pentium	$2873	$3078	$3308
P-133, Intel Pentium	$2938	$3143	$3373
P-166, Intel Pentium	$3208	$3413	$3643

NOTEBOOK FEATURES

	PVT/M	PENTIMEDIA/CD
Intel CPU Options	P 75 to P-120	P 75 to P-166
Int CPU L2 Cache	256k	256k
Base / Max RAM	8 mb / 40 mb	8 mb / 32 mb
Local Bus Video RAM	VLB 1 mb	PCI 2 mb
Max Removable HDD,	2 GB	2 GB
Floppy Drive	1.44 mb	1.44 mb
DSTN Colour LCD	10" 640x480	12 1" 800x600
External Monitor	simultaneous, 1024x768	
Ports	1 parallel 1 serial, 1 external video port	
Two PCMCIA slots	Type II & III	Type II & III
SVGA, PCMCIA Drivers	Included	Included
Pointing Device	Pointing device	Trackpad
Battery Type	NiMH	NiMH
Sound	16-bit, speaker, microphone	
Joystick	No	Yes
CD-ROM	Optional external	built-in 6xCD-ROM
Carry Case, AC Adaptor	Included	Included
Dimensions (inches)	11.3 x 10 x 2 2	11 7 x 8 6 x 2.2
Battery Life w/power mgmt	2-3 hours	approx 1hr with cdrom

NOTEBOOK UPGRADES & ADD-ONS (AT TIME OF PURCHASE)

Each mb of 70 ns fast RAM (e.g. 8 more mb only $160!!WOW!!)	$20
Ntbk PVT/M with Pentium 10" DSTN to 8 8 active matrix LCD	$389
Ntbk Pentimedia /CD 11 3" DSTN to 10 4"/12 1" active matrix	$289/579
MS-DOS 6.22 full OEM package disks and manuals	$89
Windows 3 1 / Win 3.11 with Workgroup (OEM)	$59/89
Windows 95 full package on CD with manuals (OEM)	$135
Extra Removable HDD case/external hard drive	$99/Call
PCMCIA 14.4 fax/modem (with notebook only)	$118
PCMCIA 28.8 fax/modem (with notebook only)	$245
PCMCIA Ethernet adaptor 10 BT	$95
PCMCIA SCSI adaptor	$389
PCMCIA 28 8 Fax/Ethernet 10BT Combo	$596
External 4X CD-ROM parallel	$395
External 6X CD-ROM parallel	$470
External Parallel 800 mb Tape Back-up	$285

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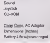
Intel CPU Options	P-100 to 200 MHz Pentium ® processor P-200 MHz Pentium Pro ® processor
Motherboard	3 PCI 4 ISA slots
BIOS/ Chipset	P133 to P 200 PnP, Intel-Triton HX (II), better than VX(III)
Cache	512k pipeline cache on P133-P200 Internal on Ppro
High Performance	Yes, Triton HX chipset on P 133 to P-200
Hard Drive & controller transfer mode	<11 ms, EIDE M4
HDD controllers	PCI enhanced dual channel support up to 4 devices
Floppy Drive	1 44 mb
Low radiation/energy monitor	15" or 17" Monitor as required*
Video Card	1 mb PCI or S3 Trio 64V+, or S3 Virge 3D w/ true EDO ram
Sound Card, Speakers	Wave32 (16/18 bit full duplex, 2 ext speakers
Enhanced keyboard & mouse	Win95 104 keys enhanced & 400 dpi
Case power supply	Enhanced deluxe tower 200 Watt
Serial/ Parallel Ports	2x16550 enhanced serial, enhanced parallel
Multimedia Option	Wave 32 sound with wavetable 8X, 10X or 12X CD
CDs included	30 titles (educational & entertainment including Comptons Encyclopedia)
Warranty	2 years parts & labour system warranty

*Entry Level Performance Package does not include monitor or CD titles.



Ultinet P-166 Performance Package
Awarded Editor's Choice
The Computer Paper December 1995

ULTIMATE PACKAGE

COMPARE. WHY PAY MORE & GET LESS

Processor	Intel Pentium or Pentium Pro Processor
External cache	512k fast 7ns pipeline burst (Pentiums)
Chipset Adv multi	TRITON HX (better than VX) or 440Fpro
RAM	fast 32 mb EDO ram
Video card	Diamond OEM S3 Virge 3D graphics & Mpeg
Video memory	The only one with true 50ns 2mb EDO ram
Mtr	17" Intliview .26dp, UVGA 1280x1024 75hz Hitachi tube
Sound	32bit (1998 rech/1998 plybk true duplex, wavetable)
Video/Fax/Modem	33 6 full telephony internet ready
Hard drive	2.5 GB enhanced IDE
Hard disk cache Controller	**16mb realtime diskcache**
CD-ROM drive	Internal 8x enh IDE
TV tuner included watch TV on your computer	
System BIOS	Latest Award Plug & Play
Plug 'n' Play support	Yes
Opr system	Win 95 full CD ver with manuals, installed
Extras	180 W Speakers microphone Wintrack keyboard
Software included	31 CD titles incl encyclopedia
Warranty	2 years Canada wide P & L system warranty

PRICING

P-133 Pentium ® processor 512k p.b cache	$2891
P-166 Pentium ® processor 512k p.b cache	$3151
P 200 Pentium ® processor, 512k p.b cache	$3631
P-Pro 200 Pentium ® processor built-in cache	$3946
Upg to Matrox Millenium with 2mb Wram/TV tuner	$310

LEASING RATE $37 per $1000, 12-36 months

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1. 12 years' reputation for free quality service and value, with over 45 000 systems sold. Toll free sales & technical support across Canada
2. First in Canada to recognize importance of and ship large quantity of TRITON-based fast Pentium systems and now with superior HX chipset. Quality Intelliview monitors with sharp images & low defects
3. Our own 40,000 square foot sales, support and manufacturing plant, conveniently located at Highway 401 & Dufferin Street.
4. Easy lease to own available for 1-3 years or $37/month for every $1000
5. All systems modifiable to your exact needs, toll free Canada wide support
6. Compare! Our volume buying power saves you at least 8-15% with no compromise quality & service: EDO RAM 512k pb cache HX chipset etc
7. 24 hour regular and automated voice and technical support.
8. Our P-133 to P-200 system motherboards use Intel's latest Triton HX chipsets. Unlike our competitors we use genuine 256k and 512k pipelined burst mode cache We do not use M520 cmd's with dummy surface-mounted write back cache to save money & lose 25% system speed! Our S3 video cards are the best as we use true 50ns EDO ram for video memory, as well as fast EDO ram for the entire system. Our Triton motherboard was featured in our 75 MHz & 100 MHz Pentium systems, that according to *The Computer Paper*

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ENTRY LEVEL PERFORMANCE PACKAGE

16 mb RAM (true 64-bit with 2x8mb 72 pin SIMMs) 1 09 GB EIDE HDD Intel Triton chipset, 8xCD-ROM true 16-bit surround sound 104 enhanced keyboard, 1 mb 32-bit PCI video full screen MPEG mouse fast 256k pipeline cache (P133-P200) incr speed by 13-17%, multimedia spkrs

P 100 Pentium ® processor 256k pipeline cache	$1038	$39/mth
P 120 Pentium ® processor 256k pipeline cache	$1079	$40/mth
P 133 Pentium ® processor 256k pipeline cache	$1148	$42/mth
P-166 Pentium ® processor 512k pipeline cache	$1418	$52/mth
P-200 Pentium ® processor 512k pipeline cache	$1786	$66/mth
P Pro 200 Pentium ® processor w/built-in cache	$2221	$82/mth
Add 14" Daytek .28dp monitor to the above		$298
Add 15" Daytek/Intelliview .28dp digital monitor to the above		$386
Upg 1 mb PCI to **Bullet S3 64V+** video with 1 mb **60 ns EDO RAM**		$40

PERFORMANCE PRO PACKAGE

16 mb EDO RAM (true 64-bit RAM 2x8mb 72-pin SIMMs) 1 7 GB EIDE HDD Intel-Triton superior HX chipset mbd (better than VX) with P133-P200 8xCD-ROM Blazer 33.6 VFX telephony modem Wave32 full duplex and with wavetable 104 enh keyboard **Bullet S3 64V+** video (Diamond OEM) with **1 mb 60 ns. EDO RAM** FS MPEG fast 512k cache (P133-P166) boosts speed by 13-17% 30 CD titles, Comptons Encyclopedia, multi media spkrs & 15" .28dp NI digital monitor

P 100 Pentium ® processor 256k pipeline cache	$1591	$59/mth
P 120 Pentium ® processor 256k pipeline cache	$1631	$60/mth
P-133 Pentium ® processor 512k pipeline cache	$1698	$63/mth
P 166 Pentium ® processor 512k pipeline cache	$1968	$73/mth
P-200 Pentium ® processor 512k pipeline cache	$2336	$87/mth
P-Pro 200 Pentium ® processor w/built in cache	$2763	$102/mth
UPG 15" to 17" .26dp Intelliview NI mtr & 2mb S3 64V+ video		$451
Upg 16mb EDO sys ram to 32mb EDO (8mbx4 or 16mbx2)		$122/166

SPECIAL EDITION II PACKAGE

16 mb EDO RAM (true 64-bit RAM 2x8mb 72-pin SIMMs) 2.5 GB EIDE HDD Intel-Triton superior HX chipset mbd (better than VX) with P133-P200, 8xCD-ROM Blazer 33.6 VFX telephony modem Wave32 full duplex sound with wavetable enh Wintrack 95 keyboard, **Bullet S3 64V+** video (Diamond OEM) with **2 mb 50 ns EDO RAM** FS MPEG, fast 512k cache (P133-P200) **boosts speed by 13-17%** 30 CD titles Comptons Encyclopedia 180 Watt premium speakers, 17" **Intelliview .26dp NI UVGA (1280x1024)** 75hz monitor (Hitachi Japanese tube) & hi-quality microphone.

P 100 Pentium ® processor 256k pipeline cache	$2148	$79/mth
P-120 Pentium ® processor 256k pipeline cache	$2188	$81/mth
P-133 Pentium ® processor 512k pipeline cache	$2256	$83/mth
P-166 Pentium ® processor 512k pipeline cache	$2525	$93/mth
P-200 Pentium ® processor 512k pipeline cache	$2896	$107/mth
P Pro 200 Pentium ® processor w/built-in cache	$3310	$122/mth

MIDTOWER SYSTEM UPGRADES & ADD-ONS

Upgrade regular 16-bit to WaveTable 32 Voice sound card	$31
Upgrade to Wintrack 95 keyboard with built-in installed	$40
IDE 1 08 GB enh. HDD to 1 7 GB/2.5 GB HDD	$70/126
IDE 1 08 GB enh HDD to SCSI 1 1 GB/2 GB HDD	$99/441
IDE 1 08 GB enh HDD to SCSI 4 GB HDD	$590
Adaptec 2940 / 2940 UW PCI SCSI controller with cables	$280 / $415
15" Daytek to .28 dp Intelliview digital 15" monitor	$80
15" to Mag DX15T 15" .26dp NI UVGA monitor Trinitron CRT	$180
15" to Sony 15" 15SFII .26dp NI UVGA monitor	$318
15" .28dp Daytek monitor to 17" .28dp Daytek monitor	$385
15" to Intelliview DH17" .26dp NI OSD UVGA,1280x1024 80hz mtr	$421
15" to Mag DX17/95 17" .26dp NI UVGA monitor	$551
15" to Digital 17" VRT17-HA .26dp NI UVGA monitor, Trinitron crt	**$640**
15" to Mag DX17T 17" .25dp NI UVGA monitor Trinitron CRT	$665
Bullet S3 64V+ (S3 785 chipset Diamond Stealth OEM) video card with true 1 mb 60 ns EDO RAM to 2 mb 60 ns EDO RAM (OEM)	$36
Bullet S3 64V+ with 2 mb 60 ns EDO RAM to Matrox Millennium 2 mb WRAM (OEM)	$197
16 to 32 mb **RAM (fast 72-pin, using 8mbx4 or 16mbx2)**	$122/$166
5 to 180W speakers (AC adaptor, bass/volume controls)	$65
8xCD-ROM to 10X or 12X	$35/85
MS Home Bundle (Encarta Dangerous Creatures Works, Entertainment)	$98
Generic 14 4/28.8 voice/fax/modem	$45/88
USR Sportster 14.4 fax/modem / 33.6 fax/modem (non voice)	$75/158
USR 33 6 voice speaker-phone/fax/modem	$179
800 mb TRAVAN internal tape back-up drive	$197
TV Tuner Card (watch TV on your monitor)	$248
Windows 95 with CD (OEM) & manuals (fully installed & configured)	$135

MOTHERBOARD SPECIALS

60/66 MHz motherboard, 256k cache Acer chipset, adv cpu	$99
Triton Chipset VX(III)/HX(II) mthrbrd: $148/$179 (incl fast 512k pb cache) 75-200 MHz, enh parallel port 2x16550 UART 2XEnh IDE MODE 4	
P-Pro, Triton 440FX chip (Natoma), $285 (single CPU)	$666 (dual CPU)
SIMM MEMORY(REG/EDO): 8mb 72-pin $51/61	16mb 72-pin $140/$188

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TRITONVX MBD 16mb EDO RAM, INTEL PENTIUM CPU, 512K PB CACHE

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ULTINET TOWER PKG #TCP1

Deluxe Tower Case & Windows 95 keyboard
Intel Pentium processor & Triton HX chipset
32 mb fast 60ns EDO ram
512k fast 7ns pipeline cache
1 6gb enh ide hard drive (10ms)
15" Intelliview 28dp monitor
S3 Virge 2mb EDO with 3D
8x cdrom with 31 titles or 7title mini office suit
Wave 32 sound card with wavetable
Ms-Windows 95 full pkg with orig cd
Blazer 33 6 voice/fax/modem free internet trial

P-133	$1755	or lease $65 /mth
P-166	$2003	or lease $74 /mth
P-200	$2317	or lease $86 /mth
Ppro-180	$2381	or lease $88 /mth
Ppro-200	$2642	or lease $98 /mth

ULTINET TOWER PKG #TCP2

Deluxe Tower Case & Windows 95 keyboard
Intel Pentium processor & Triton HX chipset
32 mb fast 60ns EDO ram
512k fast 7ns pipeline cache
2 1gb enh ide hard drive (10ms)
15" Intelliview 28dp monitor
S3 Virge 2mb EDO with 3D
8x cdrom with 31 titles or 7 title mini office suite
SB16 (OEM) Creative Labs Soundblaster 16
Ms-Windows 95 full pkg with orig cd
US Robotics 33 6 v/f/x modem, free internt trial

P-133	$1968	or lease $73 /mth
P 166	$2216	or lease $82 /mth
P-200	$2530	or lease $94 /mth
Ppro-180	$2594	or lease $94 /mth
Ppro-200	$2855	or lease $106 /mth

ULTINET TOWER PKG #TCP3

Deluxe Tower Case & Windows 95 keyboard
Intel Pentium processor & Triton HX chipset
32 mb fast 60ns EDO ram
512k fast 7ns pipeline cache
3 1gb enh ide hard drive (10ms)
15" Intelliview .28dp monitor
S3 Virge 2mb EDO with 3D
12x cdrom with 31 titles or 7title mini office suit
SB16 (OEM), Creative Labs Soundblaster 16
Ms Windows 95 full pkg with orig cd
US Robotics 33 6 v/f/x modem free internt trial

P-133	$2090	or lease $77 /mth
P-166	$2338	or lease $87 /mth
P-200	$2652	or lease $98 /mth
Ppro-180	$2718	or lease $100 /mth
Ppro-200	$2977	or lease $110 /mth

ULTINET TOWER PKG #TCP4

Deluxe Tower Case & Windows 95 keyboard
Intel Pentium processor & Triton HX chipset
32 mb fast 60ns EDO ram
512k fast 7ns pipeline cache
2 5gb enh ide hard drive (10ms)
17" Intelliview (Hitachi tube) 26dp monitor
S3 Virge 2mb EDO video with 3D accelerator
8x enh ide cdrom
Wave 32 sound Including wavetable
Ms-Windows 95 full pkg with orig cd
Wave 32 sound card with wavetable
Blazer 33.6 Voice fax modem free internet trial

P-133	$2145	or lease $78 /mth
P-154	$2392	or lease $88 /mth
P-200	$2706	or lease $100 /mth
Ppro-194	$2770	or lease $102 /mth
Ppro-200	$3031	or lease $112 /mth

ULTINET TOWER PKG #TCP5

Deluxe Tower Case & Windows 95 keyboard
Intel Pentium processor & Triton HX chipset
32 mb fast 60ns EDO ram
512k fast 7ns pipeline cache
3 1gb enh ide hard drive (10ms)
17" Intelliview (Hitachi tube) .26dp monitor
S3 Virge 2mb EDO video, with 3D accelerator
12x cdrom 31 titles or 7 mini office suite
SB16 (OEM) Creative Labs Soundblaster 16
Ms-Windows 95 full pkg with orig cd
US Robotics 33.6 v/f/x modem free internt trial

P-133	$3429	or lease $90 /mth
P-166	$2677	or lease $99 /mth
P-200	$2991	or lease $111 /mth
Ppro-180	$3055	or lease $113 /mth
Ppro-200	$3316	or lease $123 /mth

ULTINET TOWER PKG #TCP6

Deluxe Tower Case & Intel Pentium processor
32 mb fast 60ns EDO ram & Windows 95 kybd
512k fast 7ns pipeline cache & Triton HX chips
3 1gb fast SCSI hard drive (9ms)
Adaptec 2940 scsi controller
17" Intelliview (Hitachi tube) .26dp monitor
S3 Virge 2mb EDO with 3D
8x SCSI cdrom 31 titles or 7 mini office suit
SB16 (OEM) Creative Labs Soundblaster 16
Ms Windows 95 full pkg with orig cd
US Robotics 33 6 v/f/x modem free internt trial

P-133	$2938	or lease $109 /mth
P-166	$3185	or lease $118 /mth
P-200	$3499	or lease $129 /mth
Ppro-180	$3563	or lease $132 /mth
Ppro 200	$3824	or lease $141 /mth

ULTINOTE/CD PKG #TCP7

Deluxe notebook design
11 3" Dual Scan 800x600 color display
Intel Pentium processor
16 mb 60ns ram upgradeable to 32mb for $160
256k internal system cache
1 3gb enh ide hard drive (10ms)
2mb Cirrus Logic video accelerator with MPEG
Built in 1 44mb floppy & 8x enh ide cdrom
Ms Windows 95 full pkg with orig cd
Cirrus Logic 33 6 v/f/x PCMCIA fax/modem
Two PCMCIA slots, with one vacant
Approx 45 min battery life, CDROM enabled
Carrying case, NiMh battery & AC adaptor incl
Secondary 2hrs addon battery option for $318

P-133	$3285	or lease $122 /mth
P 166	$3511	or lease $130 /mth

ULTINOTE/CD PKG #TCP8

Deluxe notebook design
10 4" TFT (Active Matrix) 800x600 color display
Intel Pentium processor
16 mb 60ns ram upgradeable to 32mb for $160
256k internal system cache
1 3gb enh ide hard drive (10ms)
2mb Cirrus Logic video accelerator with MPEG
Built in 1 44mb floppy & 6x enh ide cdrom
Ms Windows 95 full pkg with orig cd
Cirrus Logic 33 6 v/f/x PCMCIA fax/modem
Two PCMCIA slots, with one vacant
Approx 45 min battery life CDROM enabled
Carrying case, NiMh battery & AC adaptor incl
Secondary 2hrs addon battery option for $318

P-133	$3480	or lease $129 /mth
P-166	$3718	or lease $137 /mth

ULTINOTE/CD PKG #TCP9

Deluxe notebook design
12 1" TFT (Active Matrix) 800x600 color display
Intel Pentium processor
16 mb 60ns ram upgradeable to 32mb for $160
256k internal system cache
1 3gb enh ide hard drive (10ms)
2mb Cirrus Logic video accelerator with MPEG
Built in 1 44mb floppy & 6x enh ide cdrom
Ms Windows 95 full pkg with orig cd
Cirrus Logic 33 6 v/f/x PCMCIA fax/modem
Two PCMCIA slots with one vacant
Approx 45 min battery life COROM enabled
Carrying case NiMh battery & AC adaptor incl
Secondary 2hrs addon battery option for $318

P-133	$4024	or lease $146 /mth
P-166	$4250	or lease $157 /mth

Upgrade S3 Virge 2mb 50ns video ram to 4mb $60
Upgrade S3 Virge 2mb to Matrox Mystique 2mb (OEM) $145
Upgrade S3 Virge 2mb to Matrox Mystique 4mb (OEM) $235
Upgrade S3 Virge 2mb to Matrox Millenium 4mb (OEM) $395
Upgrade notebook 1.3gb hdd to 2gb $214
Upgrade to P166/P200, with MMX processor & ASUS HX (the best) mbd .. $220/320*

[illegible]

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Ultinet accepts phone orders and ships mail order across Canada!

Prices [illegible] on cash COD or lease & [illegible] to change without notice. For credit cards, Corporate or Gov POs add 3%. Shipping per full system $[illegible] within ontario, $55 outside of ontario.

Triton II 3D Station

Intel Pentium Processor with Fan (support up to 200MHz)
[illegible] II 430VX PCI/ISA Main Board w/256KB Pipeline Cache
16MB-60ns EDO Performance-Enhanced DRAM exp. to 128MB
1.44MB Floppy Drive
1.2GB Fast IDE Hard Drive (Mode 4)
PCI Enhanced IDE Cont. w/ 2x16550 Serial, 1xBi Directional Parallel
PCI ATI 3D Xpression + PC2TV 64-bit Accelerator w/2MB SDRAM
Creative Labs Sound Blaster 32 Card with 60W Speakers(P.M.P.O.)
8x Speed EIDE CD-ROM
Sceptre 15" Non-Int. Low Rad. SVGA Monitor PnP
Mid-Tower Case with CSA Power Supply
104-keys Windows 95 Keyboard, 3 Button Mouse
2 Year Parts & Service Warranty

EDO MEMORY

PnP 32

100 MHz	$1,600
120MHz	$1,620
133MHz	$1,665
150MHz	$1,735
166MHz	$1,895
200MHz	$2,190

New! Multimedia System with

MMX Technology

166MHz w/ MMX Tech $2,020
200MHz w/ MMX Tech $2,380

3D Games INCLUDED

Pentium Pro ATX

Intel Pentium Pro Processor with Fan
Intel Venus 82440FX PCI/ISA ATX Main Board
256KB Internal L2 Cache
16MB-60ns EDO Performance Enhanced DRAM exp. to 256MB
1.44MB Floppy Drive
2.1GB Fast IDE Hard Drive (Mode 4)
PCI EIDE Cont. w/2x16550 Serial, 1xBi Directional Parallel
PCI Rev 2.1 5V interface compliant
PCI ATI Video Boost Windows Accelerator w/1MB (exp. to 2MB)
Sceptre 15" Non-Int Low Rad. SVGA Monitor PnP
ATX Mid Tower Case with CSA Power Supply
104-keys Windows 95 Keyboard
3 Button MS Compatible Mouse
2 Year Parts & Service Warranty

180MHz $2,200
200MHz $2,330

SuperMicro Dual Pentium Pro System

Dual 200MHz ... C a l l

Free Installation

Pentium Triton II PCI MainBoard
w/256 KB Pipeline Cache

AMD

w/AMD K5-90MHz	w/AMD K5-133MHz
$195.00	$275.00

IDE Hard Drive Special !

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1.2GB	$256
1.6GB	$295
2.1GB	$325

HARD DRIVE

2.5GB $365

Free Installation !

PCI Main Board w/256 KB Cache

w/486 DX4100MHz	w/486 DX5133MHz
$155.00	$165.00

Triton II Power Station

Features:
Intel Pentium Processor with Fan (support up to 200MHz)
Triton II 430VX chipset PCI/ISA Main Board w/256KB Pipeline Cache
8MB-60ns EDO Performance Enhanced DRAM exp. to 128MB
1.44MB Floppy Drive
1.2GB Fast IDE Hard Drive (Mode 4)
PCI Enhanced IDE Controller
PCI Cirrus Logic 5446 Windows Accelerator w/1MB DRAM(exp. to 2MB)
2x16550 UART Serial, 1 Bi-Directional Parallel
14" Non-Int SVGA Monitor .28mm dp
Mid-Tower Case with 230W CSA Power Supply
104-keys Win95 Keyboard
3 Button MS Compatible Mouse
2 Year Parts & Service Warranty

64-Bit MPEG PLAYBACK

PENTIUM

100MHz	$ 970	150MHz	$1,105
120MHz	$ 990	166MHz	$1,265
133MHz	$1,035	200MHz	$1,560

Triton II Power Station Plus

Features:
Intel Pentium Processor with Fan (support up to 200MHz)
Triton II 430VX chipset PCI/ISA Main Board w/256KB Pipeline Cache
8MB-60ns EDO Performance Enhanced DRAM exp. to 128MB
1.44MB Floppy Drive
1.2GB Fast IDE Hard Drive (Mode 4)
PCI Enhanced IDE Controller
PCI Trident 9685 3D Accelerator w/1MB RAM (exp. to 2MB)
Clear TV Integrated TV Display Support
2x16550 UART Serial, 1 Bi-Directional Parallel
14" Non-Int SVGA Monitor .28mm dp
Mid-Tower Case with 230W CSA Power Supply
104-keys Win95 Keyboard
3 Button MS Compatible Mouse
Creative Labs Sound Blaster 16 Card
8x Speed EIDE CD-ROM, 60W Speakers (P.M.P.O.)
2 Year Parts & Service Warranty

SEGA Virtua Fighter [illegible]

PENTIUM

100MHz	$1,235	150MHz	$1,370
120MHz	$1,255	166MHz	$1,530
133MHz	$1,300	200MHz	$1,825

Internet Ready

Features:
AMD K5 PCI/ISA Main Board w/256KB Cache
16MB-60ns EDO DRAM exp. to 128MB
1.44MB Floppy Drive
1.2GB Fast IDE Hard Drive(Enhanced Mode4)
PCI Enhanced IDE Controller
PCI Trident 9680 Windows Accelerator with 1MB DRAM(expandable to 2MB)
2 x 16550 Serial 1 Parallel & 1 Game Port
14" Non-Int SVGA Monitor .28mm dp
Mini-Tower Case with CSA Power Supply
104 keys Win95 Keyboard 3 Button Mouse
Creative Labs Sound Blaster 16 Card
8x Speed EIDE CD-ROM, 60W Speaker (PMPO)
33.6bps Internal Fax Modem
Axion Internet (30 Days free access)
2 Year Parts & Service Warranty

AMD K-5

AMD K5-90MHz	$1,245
AMD K5-133MHz	$1,325

Video Graphics Adapters

ATI Mach 64 Video Boost PCI 1MB/2MB DRAM	$160/1[illegible]
ATI Mach 64 WinTurbo PCI w/2MB VRAM	$224.00
ATI Mach 64 Win Turbo PCI w/4MB VRAM	$351.00
ATI 3D Xpression + PCI 2MB/4MB (w/3D Games)	$193/235
ATI 3D Xpression + PC2TV 2MB/4MB (w/3D Games)	$217/2[illegible]
ATI 3D Pro Turbo PC2TV w/4MB (w/3D Games)	$299.00
ATI TV Tuner Card	$145.00
Diamond Stealth 64 Video PCI 1MB/2MB DRAM	[illegible]/140
Diamond Stealth 3D 3240XL PCI w/2MB VRAM	$305.00
Diamond Stealth 3D 3400XL PCI w/4MB VRAM	$315.00
Diamond Stealth 3D 2000 PCI 2MB/4MB EDORAM	$187/1[illegible]
Matrox Millennium PCI 2MB/4MB WRAM	$260/370
Matrox Mystique 3D Accelerator 2MB/4MB SDRAM	$180/235
Cirrus Logic 5446 PCI w/1MB exp. to 2MB (MPEG)	$40.[illegible]
S3 64V+ PCI w/1MB exp. to 4MB (MPEG)	[illegible]
Trident 9685 3D Accelerated 1MB (w/3D Games)	$[illegible]

Monitors

AD 4VLR 15" NI L/R(1280x1024 .28mmDP)	$455.00
AD 5VLR 17" NI L/R(1280x1024 .28mmDP)	$785.00
Mag DX1800 15" NI(1280x1024 .28mmDP)	$479.00
Mag DJ700 17" NI(1280x1024 .28mmDP)	$885.00
Mag DX700T 17" NI (1280x1024 .26mm Trinitron)	$1025.00
NEC XV15+ 15" NI L/R(1280x1024 .28mmDP)	$5[illegible]0.00
NEC XV17+ 17" NI L/R(1280x1024 .28mmDP)	$1115.00
NEC M500 15" .28mmDP Mask Pitch	$545.00
NEC M700 17" .25mm DP Mask Pitch	$1115.00
NEC P750 17" NI L/R(1600x1200 .25mmDP)	$1390.00
Proview 14" NI L/R(1024x768 .28mmDP)	$250.00
Proview 15" NI L/R(1280x1024 .28mmDP)	$340.00
Sceptre 15" NI L/R(1280x1024 .28mmDP) PnP	$378.00
Sony 100SX 15" NI L/R(1280x1024 .25mmDP) PnP	$565.[illegible]
Sony 100SF 15" NI L/R(1280x1024 .25mmDP) PnP	$64[illegible]
Sony CPD-200SX 17" NI(1280x1024 .25mmDP)	$960.00
Sony CPD-200SF 17" NI(1600x1280 .25mmDP)	$11[illegible]
Viewsonic V775 17" NI(1600x1280 .27mmDP)	$[illegible]

HD/FD Controllers

ISA IDE HD/FD Controller with I/O UART 16550	$22.00
VLB Enhanced IDE with I/O UART 16550	$28.00
Adaptec 1505 SCSI CD-ROM Controller	$70.00
Adaptec 1542CP SCSI HD/FD Controller PnP	$270.00
Adaptec 2920 PCI SCSI Controller	$140.00
Adaptec 2940U PCI SCSI Controller	$280.00
Adaptec 2940UW PCI SCSI Controller	$325.00
Adaptec 3940 PCI Multi-Channel SCSI Controller	$630.00

Keyboards & Cases

Fujitsu 4725 Enhanced 104 Keys	$54.00
Fujitsu 5725 Enhanced 104 Keys	$28.00
Lite-On Ergonomic Keyboard w/Touch Pad	$85.00
Mitsumi Windows 95 Keyboard	$18.00
Microsoft Natural Keyboard	$78.00
26" Server Tower with 300W CSA Power Supply	$235.00
Full Size Tower with 230W CSA Power Supply	$110.00
Mid Size Tower with 230W CSA Power Supply	$78.00
Mini Size Tower with 200W CSA Power Supply	$[illegible]
Desktop with 200W CSA Power Supply	$[illegible]

Drives & Tape Backup

[illegible] 1.44MB 3.5" Floppy Drive	$[illegible]
Enhanced 1.08GB IDE Hard Drive	$230.[illegible]
Enhanced 1.2GB IDE Hard Drive	$250.00
Enhanced 1.6GB IDE Hard Drive	$245.[illegible]
Enhanced 2.1GB IDE Hard Drive	$325.00
Enhanced 2.5GB IDE Hard Drive	$365.00
Enhanced 3.1GB IDE Hard Drive	$435.00
Enhanced 5.1GB IDE Hard Drive	$[illegible]
Iomega 100MB Int/Parallel ZIP Drive	$26[illegible]
Iomega 1GB Int/Ext JAZ Drive	$550/[illegible]
Syquest EZFlyer 230 Ext Parallel/SCSI Remov. HDD	$3[illegible]
Syquest SyJet 1.3GB Int IDE/SCSI Remov. HDD	$52[illegible]
Syquest SyJet 1.3GB Ext SCSI/Parallel Remov. HDD	$[illegible]
HP Colorado T1000 [illegible] Backup Drive	[illegible]
HP Colorado T3000 TR-3 Int. Backup Drive	$209.00
[illegible] 800MB TR-1 Int/Ext Tape Backup Drive	$170/215
Seagate 3200MB TR-3 Int/Ext Tape Backup Drive	$265/305
Seagate 4GB TR-4 Int IDE/SCSI Tape Backup Drive	$[illegible]

Motherboards

Triton II Pentium [illegible]MHz w/256KB Burst Cache	$[illegible]
Gigabyte ATX Dual Pentium Board w/SCSI Interface	$ C a l l
Intel ATX Pentium Pro 200MHz PCI/ISA Main Board	$ C a l l
SuperMicro Dual Pentium Pro 200MHz PCI/ISA Board	$ C a l l
486DX4-100/AMD5X5-133 PCI/ISA w/256KB Cache	$15[illegible]/165

MultiMedia

Creative Labs 12X Discovery PnP	$405.00
Creative Labs Sound Blaster 16 PnP	$82.50
Creative Labs Sound Blaster 32 PnP	$13[illegible].00
Creative Labs Sound Blaster AWE64 PnP	$250.00
Creative Labs 4210 Int. 4X/2X SCSI CDR	$645.00
8X IDE CD-ROM Drive	$135.00
12X IDE CD-ROM Drive	$180.00
Hewlett Packard Surestore [illegible] 6X/2X CDR	$778.00
Pioneer 12X SCSI CD-ROM Drive	$23[illegible]
Plextor 12X SCSI CD-ROM Drive	$[illegible]

Modem & Mice

14.4 S/R Int. Fax Modem w/Voice	$50.00
33.6 S/R Int. Fax Modem	$95.00
33.6 S/R Int. Fax Modem w/Voice	$115.00
Cardinal IDC-100 ISDN Adapter	$275.00
Supra 33.6 Int. Fax Modem w/Voice	$128.00
US Robotics Courier I-Modem ISDN Int/Ext	$[illegible]
US Robotics Sportster ISDN 128K Int.	$325.00
US Robotics 33.6 Int Fax Modem	$1[illegible]
US Robotics 33.6 Ext Fax Modem	$234.00
US Robotics 33.6VI Int Modem(Full Duplex)	$[illegible]
US Robotics 33.6VI Ext Modem(Full Duplex)	$2[illegible]
US Robotics Big Picture Video Kit	$525.00
Microsoft Mouse v.2 OEM	$38.00
Logitech Mouseman OEM	$32.00
Microsoft Comp. Mouse	$18.00

Printers

Canon BJ-240 Color Inkjet	$249.00
Canon BJC-4100 Color Inkjet	$310.00
Brother HL730DX Laser Printer 600dpi	$825.00
Epson Stylus 500 Color Inkjet 720dpi	$389.00
Epson Stylus II Color Inkjet 720dpi	$233.00
HP 400 Deskjet Color Printer	$285.00
HP 690C Deskjet Color Printer	$418.00
HP 820Cse Deskjet Color Printer	$648.00
HP 870Cse Deskjet Color Printer	$[illegible]
HP 5MN Laserjet, 600 dpi 12 PPM	$1700/2[illegible]
HP 6L Laserjet, 600 dpi 4 PPM	$[illegible]
HP 6P/6MP Laserjet, 600 dpi 8 PPM	$1085/[illegible]
HP 5Si Laserjet 600 dpi 24 PPM	$3840.00
Raven PR 2405 24-pin 192 cps	$235.00

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1MB 70ns 30-Pin SIMM	$ 8.50
4MB 70ns 30-Pin SIMM	$25.00

Seagate

800MB Travan-1 Internal Tape Backup Drive

$95.00

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Games Included !!

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Cirrus Logic

Cirrus Logic 5429 VESA Bus Windows Accelerator w/1MB exp to 2MB

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- 600 dpi quality graphics resolution
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NetWare v4.1 25/50 User	$2350/2810
NetWare v4.1 100/250 User	$4110/Call
NetWare v4.1 500/1000 User	Call/Call
NetWare v4.1 Manuals Only	$210

[illegible]

MICROSOFT NT

Windows NT Server v4.0 CD w/5 Clients Lic.	$1000
Windows NT Server v4.0 CD w/10 Clients Lic.	$1380
Windows NT v4.0 Client Access Lic.	$45
Windows NT Server v4.0 upgrade w/5 Clients Lic.	$505
Windows NT Server v4.0 upgrade w/10 Clients Lic.	$610
Windows NT Workstation 4.0 CD	$380
Windows NT Workstation 4.0 upgrade	$155
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BackOffice v2.0 Server upgrade CD	$580
Microsoft SMS version 1.2 w/10 Clients Lic.	$1387
Microsoft SMS version 1.2 w/25 Clients Lic.	$2200
Microsoft SNA Server v2.11 Windows NT	$500

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HP 5N LaserJet,600dpi,12ppm,6MB	$2170
HP 5Si LaserJet,600dpi,24ppm,8MB	$3640
HP 5Si NX Network Ready,600dpi,24ppm	$4300
HP 5Si Mopier	$15750
HP 4V LaserJet,600dpi,16ppm	$2900
Lexmark Optra R/N+ 16ppm 8MB	$2200
Lexmark Optra LXN+ 16ppm,8MB	$2530
Lexmark Optra LXN+ 16ppm,8MB Token Ring	$3060
Lexmark Optra N,24ppm,4MB	$3600
Lexmark Optra N,24ppm,16MB Token Ring	$4380
Lexmark Optra LX+ 16ppm 4MB	$2750
Lexmark Optra N 24ppm 16MB	$4460
Lexmark Optra C Pro 24ppm 52MB	$9860

TAPE & CD DRIVE

Exabyte Eagle TR-3 int. Backup Drive	$269
Exabyte Eagle TR-3 int. Backup Drive w/Host	$285
Exabyte 8505XL 3.5-7GB Int/Ext 8mm	$1050/2190
Exabyte 8900XL 7-14GB Int/Ext 8mm	$2700/3000
Exabyte 8700LT 5-10GB Ext 8mm Drive	$1365
Iomega Ditto Easy 800 Int/Ext	$140/209
Iomega Ditto 2GB Int/Ext Tape Drive	$215/300
Iomega Ditto 3200 3.2GB Int/Ext	$326/400
Hewlett Packard Surestore CD-R 4020i	$1185
Seagate 4320NT 2GB 4mm DAT Int. SCSI Drive	$770
Seagate 4324NP 4GB 4mm DAT Int. SCSI Drive	$880
Seagate 4326NP 8GB 4mm DAT Int. SCSI Drive	$1185
Seagate [illegible]-SS 8GB Int. SCSI Drive	[illegible]
Sony SDT 2000E Int/Ext 2GB DAT	$840/1138
Sony SDT-4000E Int/Ext 2-4GB DAT	$1005/1255
Sony SDT-5200 Int/Ext 4GB DAT	$1050/1245
Sony SDT 7000 Int/Ext 8GB DAT	$1520/1450

POWER PROTECTION

APC B[illegible] 280

$145.00

American Power 120 Volt

BackUPS 200/280	$125/140
BackUPS 400/450	$255/255
BackUPS 600/900/1250	$345/455/530
Backup Pro 280/420/650	$280/340/415
BackUPS Pro 1000/1400	$645/780
SmartUPS 450/700/1000	$355/555/800
SmartUPS 1400/2200/3000	$950/1480/2320
Matrix 3000VA/5000VA (Modular UPS)	$3738/5500
SmartCELL for Matrix	[illegible]
Line Conditioner LR600/LR1250	$110/245
PowerChute Part for Novell v4.22	[illegible]
PowerChute for Windows	[illegible]
Network Surge Arrest 3 Outlet/7 Outlet	$20/30
PowerManager 6 Outlet	[illegible]
PowerNet SNMP agent for Novell	$157

CABLES & JACKS

Twisted Pair

Assembly 10 BaseT Cable 6/25/50 ft	$10/18/25
Assembly 10 BaseT Cable 100 ft	$85
Cable 10BaseT 4c UTP per ft	$0.35
Cable 10BaseT 4c UTP per 1000 ft	$220
Connector RJ45M	$1.00

Coaxial

Assembly RG58A/U Thin Coax 25/50 ft	$15/22
Assembly RG58A/U Thin Drive 100 ft	$33
Cable RG58A/U Bulk per ft	$0.25
Cable RG58A/U Bulk per 1000 ft	$180
Connector BNC "T"	$2.50
Terminator BNC 52 ohm	$3.00
Tool BNC Crimping	$50
Terminator BNC 52 ohm w/ground strap	$10

ETHERNET COAX / COMBO Adapters

3COM 3C503 Etherlink II BNC ea/5+	$275/240
3COM 3C509B Etherlink III BNC ea/5+	$150/135
3COM 3C509B Etherlink III BNC 20 pk	$2485
3COM 3C509B Combo BNC/RJ45 ea/5+	$160/145
3COM 3C509B Combo BNC/RJ45 20 pk	$2830
3COM 3C509B Combo BNC/RJ45 100 pk	$11080
3COM 3C579 Combo BNC/RJ45 EISA	$283
3COM 3C900 PCI Ethernet Combo	$170
CNet CN200E+ BNC Ethernet Jumpless	$80
CNet CN650E+ BNC & 10BaseT Ethernet	$85
CNet CN800 PCI Ethernet Combo	$115
GVC 2000B1 ISA Coaxial/10BaseT Jumpless	$55
GVC 2000P1 PCI Coaxial/10BaseT Jumpless	$80
Intel ISA EtherExpress Pro 10+ Combo	$150
Intel ISA EtherExpress Pro 10+/Flash Combo	$180
Intel PCI EtherExpress Pro 10+ Combo	$183
SMC 8416B ISA EtherEZ Coax	$123
SMC 8416B1 ISA EtherEZ Combo	$158
SMC 8432B1 PCI EtherPower Combo	$180

Print Servers

Emulex NetQue[illegible] 10BaseT Print Server	[illegible]
Emulex NetJet NT + Print Server	$835
HP JetDirect J2550A RJ45	$883
HP JetDirect J2552A RJ45/BNC/LocalTalk	$518
HP JetDirect J2556A Token Ring DB-9 & RJ45	$745
HP JetDirect EX Port J2591A	$480
HP JetDirect EX Plus3 J2593A RJ45/BNC	$825
HP JetDirect EX Plus3 J2594A token Ring DB-9 & RJ45	$730
HP JetDirect J2590A 10/100VG Print Server	$708
Intel NetportExpress Pro Ext. Printer Server	$515
Intel NetportExpress Pro Int. Printer Server	$585
Intel NetportExpress [illegible] 10/100 Ext. Printer Server	[illegible]

PCMCIA Adapters

3COM 3C589 EtherLink TPO	[illegible]
3COM 3C589 Etherlink III Combo	$285
3COM 3C689 TokenLink III	$455
D-Link DE-650T PCMCIA TPO NE2000 Compatible	$198
D-Link DE-650CT PCMCIA Combo NE2000 Compatible	$215
D-Link DME 288T Ethernet/Modem	$535
GVC PCMCIA Ethernet Combo + 28.8bps Modem	$428
SMC 8020T EtherEZ PC Card (RJ45)	$105
SMC 8020BT EtherEZ PC Card Combo	$225
Xircom PCMCIA Ethernet RJ45	$180
Xircom PCMCIA Ethernet BNC & RJ45	$228
Xircom PCMCIA RJ45 Ethernet + 28.8bps Modem	$408
Xircom PCMCIA Combo Ethernet + 28.8bps Modem	$485
Xircom PCMCIA 10/100 Ethernet Ready	$250

10 BASE T HUBS

3COM 3C16700 [illegible] 8 Port Hub	$935
3COM 3C16670 Linkbuilder FMS II 12 Port	$1008
3COM 3C16671 Linkbuilder FMS II 24 Port mgmt	$1210
3COM 3C16672 24 Port Token	$1550
3COM 3C16675 Linkbuilder FMS II 48 Port mgmt	$2000
3COM 3C16405 12 Port Switch Hub	$820
3COM 3C16406 24 Port Switch Hub	$1555
3COM 3C16700 OfficeConnect 8/TPO	$155
3COM 3C16701 OfficeConnect 8/TPC	$108
3COM 3C16710 OfficeConnect 8/TPO	[illegible]
CNet CN800TPC 8 Port Hub	$120
CNet CN800TPC 12 Port Hub	$205
CNet CN8816TPC 16 Port Hub, Small Footprint	$285
CNet CN8000TPC 12 Port Hub	$535
CNet CN9916TPC 12 Port Hub w/SNMP	$795
D-Link DE-808TC 8 Port Hub	$145
D-Link DE-812TP 12 Port Hub	$210
D-Link DE-816TP 16 Port Hub	$175
D-Link DE-824TP 24 Port Hub	$499
Hewlett Packard AdvanceStack 12 J3200A	$715
Hewlett Packard AdvanceStack 24 J3201B	$1285
Hewlett Packard AdvanceStack 48 J3202B	$2455
Hewlett Packard 12 Port EtherTwist J3[illegible]	$1260
Hewlett Packard 48 Port EtherTwist	$2600
SMC 3605T-EZ 5 Port Hub	$115
SMC 3608TC-EZ 8 Port Hub	[illegible]
SMC 3616TC-EZ 16 Port Hub	$380
SMC 3908TA TigerHub 8 Port Hub	[illegible]
SMC 3208BC TigerHub 8 Port Hub BNC	$805
SMC 3208FC TigerHub 8 Port Fibre	$1880
SMC 3312TC TigerStack 12 Port Hub	$635
SMC 3328TC TigerStack 28 Port Hub	$1130
SMC 3308T TigerStack 28 Port Hub	$1155

10 BASE T Adapters

3COM 3C503 [illegible] TP ea/5+	$275/240
3COM 3C509B TPO ea/5+	$119
3COM 3C590 TPO PCI	$185
3COM 3C592 TPO EISA	$252
3COM 3C900 TPO PCI	$150
CNet CN600E+ 10 Base T Jumpless	$55
CNet CN970PBT 10 Base T PCI	$113
HP EtherTwist 16 Bit BaseT J2406A ea/5+	$150
Intel ISA EtherExpress Pro 10+ 10BaseT	$123
Intel ISA EtherExpress Pro 10+/Flash 10BaseT	$135
Intel PCI EtherExpress Pro 10+ 10BaseT	$150
Microdyne NE 2000T + 10 BaseT	$85
Microdyne NE 2000T+ 10 Base T 30 pk	$1700
Microdyne NE3300 EISA Combo	$215
Microdyne NE5500T PCI 10BaseT	$145
Microdyne NE5500+ PCI 10BaseT	$168
SMC 8416T ISA EtherEZ 10BaseT	$123
SMC 8432T PCI EtherPower 10BaseT	$155

100 MBPS SYSTEMS

COM 3C905 Tx PC
ast Ethernet Adapte
$185.00

3COM 3C905-TX FastEthernet PCI ea/5+	$185/178
3COM 3C591-TX FastEthernet EISA	$325
3COM 3C16720 FastEthernet 8 Port Hub	$1588
3COM 3C250-TX Linkbuilder FMS 100 12 Port Hub	$2380
D-Link DFE-500TX PCI FastEthernet	$185
Intel Pro 100 ISA FastEthernet	$335
Intel Pro 100 PCI FastEthernet	$140
Intel Pro 100 Smart FastEthernet	[illegible]
Intel PC100TX Express 100Base-TX 12 Port Hub	$2250
HP Networks 100VG ISA Adapter	$238
HP Networks 100VG EISA Adapter	$320
HP Networks 100VG PCI Adapter	$200
SMC Etherpower 10/100Base-T PCI	$190
SMC Etherpower 10/100 PCI Dual Channel	$325
SMC 5208w TigerHub 10/100 8 Port Hub	$855

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525CD	133MHz Pentium	16MB	1.2GB	8X	[illegible]
525MCx	133MHz Pentium	16MB	1.2GB	8X	[illegible]
525CD	166MHz Pentium	16MB	1.6GB	8X	[illegible]
525MCx	166MHz Pentium	16MB	1.6GB	8X	$3,070.00
525MCx	200MHz Pentium	32MB	[illegible]	8X	[illegible]

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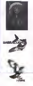
PC340 P166MHz 16MB, 2.5GB HD Win95 256KB PB Cache $2,650

PC350 P133MHz 16MB, 1.2GB HD Win95 $2,200
PC350 P133MHz 16MB, 1.2GB HD 6X CD-ROM Drive Win95 $2,480
PC350 P133MHz 32MB, 1.6GB HD Win NT $2,800
PC350 P166MHz MMX 16MB 2.5GB HD Win95 $3,000
PC350 P200MHz MMX 32MB 2.5GB HD Win95 $3,700

PC365 P6-180MHz 16MB 1.6GB HD No O/S $2,800
PC365 P6-200MHz 32MB, 1.6GB HD 8X CD-ROM Drive Win NT $3,950
PC365 P6-200MHz 32MB 2.1GB SCSI HD 6X PD/CD Drive, Win NT $6,150

Seagate



Capacity	Model	Access	Cache	RPM	Interface	Price
1.08GB	ST51080N	12.8ms	128K	5400	SCSI-2	$380
1.05GB	ST31051N	9ms	256K	5411	SCSI-2	$405
1.05GB	ST31051W	9ms	512K	5411	WIDE SCSI	$580
1.05GB	ST31055N	9ms	512K	5411	ULTRA SCSI	$420
1.05GB	ST31055W	9ms	512K	5411	ULTRA WIDE	$590
2.1GB	ST32151N	9ms	512K	5411	SCSI-2	$675
2.1GB	ST32151W	9ms	512K	5411	WIDE SCSI	$770
2.1GB	ST32155N	9ms	512K	5411	ULTRA SCSI	$680
2.1GB	ST32155W	9ms	512K	5411	ULTRA WIDE	$765
2.1GB	ST32550N	8ms	512K	7200	ULTRA SCSI	$950
4.3GB	ST34371N	8ms	512K	7200	ULTRA SCSI	$1540
4.3GB	ST34371W	8ms	512K	7200	ULTRA WIDE	$1630
4.3GB	ST34371WC	8ms	512K	7200	ULTRA WIDE S	$1630
4.3GB	ST34371WD	8ms	512K	7200	ULTRA WIDE D	$1680
4.5GB	ST34501N	7.8ms	512K	10000	ULTRA SCSI	$1990
4.5GB	ST34501W	7.8ms	512K	10000	ULTRA WIDE	$2075
4.5GB	ST34501WC	7.5ms	512K	10000	ULTRA WIDE D	$2085
9GB	ST19171N	8ms	512K	7200	ULTRA SCSI	$2790
[illegible]	[illegible]	[illegible]	[illegible]	7200	ULTRA WIDE	[illegible]
9GB	ST410800W	11ms	1MB	5400	WIDE SCSI	$2770

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Two Button Mouse
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Keyboard & FastMedia Remote Control
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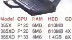
2430CD	P133	16MB	1GB	6X	11 3 DSTN	$3 600
4200	P100	8MB	810MB		10 4 TFT	$3 500
4230	P133	8MB	1GB	6X	10 4 TFT	$4 100
6030H	P133	16MB	1 35GB	6X	11 3 TFT	$5 375
6030X	16MB	16MB	1GB	6X	12 1 TFT	$5 650
6050MH	P150	16MB	1 4GB	10X	12 1 TFT	$6 700
6050MX	P150	16MB	2 1GB	10X	12 1 TFT	$7,350

AST COMPUTER

ASCENTIA

Model	CPU	RAM	HDD	CD	Display	Price
A41	P120	16MB	1GB	6X	11 3 DSTN	Call
A42	P120	16MB	1GB	6X	12 1 TFT	Call
J55	P133	16MB	1GB		11 3 TFT	$4 150
P30	P100	8MB	800MB		11 3 DSTN	$3 050
P40	P120	16MB	1GB		11 3 TFT	Call
P50	P133	8MB	800MB	4X	11 3 TFT	$3 850
P50	P133	24MB	1GB	6X	12 1 TFT	$5 470
P50	P133	24MB	2 1GB	6X	12 1 TFT	$8 025

IBM ThinkPad

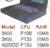


Model	CPU	RAM	HDD	CD	Display	Price
355X	P120	8MB	810MB		10 4 TFT	$2 670
365XD	P120	8MB	810MB	4X	10 4 TFT	$2 950
355XD	P133	8MB	1 4GB	6X	11 3 TFT	$4 195
760ED	P133	16MB	2 1GB	6X	12 1 TFT	$8 500
760EL	P133	16MB	2 1GB		12 1 TFT	$7 060
760EL	P133	32MB	2 1GB		12 1 TFT	$8 200
760E	P150	16MB	2 1GB		12 1 TFT	$8 100

TEXAS INSTRUMENTS

Model	CPU	RAM	HDD	CD	Display	Price
600CD	P120	8MB	810MB	6X	12 1 DSTN	$2,880
650CD	P133	16MB	1 35GB	10X	11 3 DSTN	$3 380
650CDT	P133	16MB	2 1GB	10X	11 3 TFT	$4 100
900	P100	16MB	1 35GB		12 1 DSTN	$4 600
900T	P133	16MB	1 35GB		11 3 TFT	$5 245
900CDT	P133	16MB	1 35GB	10X	11 3 TFT	$5 900
6020	P120	8MB	1GB		11 3 TFT	$3 850
6030	P133	16MB	1 35GB		12 1 TFT	$4 800
6050	P150	16MB	1 35GB		12 1 TFT	$5 300
6050NT	P150	32MB	2 1GB	10X	12 1 TFT	$6 200
6160	P166	32MB	2 1GB	10X	12 1 TFT	$6 900
6160NT	P166	32MB	2 1GB	10X	12 1 TFT	$7 100

SCEPTRE SOUNDX



Model	CPU	RAM	HDD	Display	Price
3900	P100	16MB	1GB	11 3 DS	$2 220
3900	P133	16MB	1GB	11 3 DS	$2 375
4000CD	P133	16MB	1GB	12 1 TFT	$4 160

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166MHz Intel Pentium MM
16MB RAM exp to 144M
2GB Hard Drive
13 3" TFT Active
1024x768 Screen Res
28 8Kbps Fax Modem
10X CD ROM
Lithium Ion Battery
Sound Blaster Pro

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TECRA 510CDT

133MHz Intel Pentium
16MB RAM exp to 144M
2 1GB Hard Drive
2MB Video RAM
11 8" TFT Active
28 8Kbps Fax Modem
10X CD ROM
Lithium Ion Battery
Sound Blaster Pro

3 YEAR

Satellite Pro 430CDT

120MHz Intel Pentium
16MB RAM exp to 40M
1 3GB Hard Drive
2MB Video RAM
11 8" TFT Active
10X CD ROM
Sound Blaster Pro

3 YEAR

Satellite 200CDS

100MHz Intel Pentium
8MB RAM exp to 40MB
810MB Hard Drive
1MB Video RAM
11 8" Dual Scan
6X CD ROM

Model	CPU	RAM	HDD	Display	Price
110CS	P100	8MB	810MB	11 3 DSTN	$1 825
110CT	P100	8MB	810MB	11 3 TFT	$2 530
200CDS	P100	8MB	810MB	11 8 DSTN	$2 275
420CDT	P100	8MB	1 3GB	11 3 TFT	$3 510
430CDS	P120	16MB	1 3GB	11 8 DSTN	$2 800
430CDT	P120	16MB	1 3GB	11 8 TFT	$4 220
500CDT	P120	16MB	1 3GB	12.1 TFT	$5 470
510CDT	P133	16MB	2 1GB	11 8 TFT	$6 470
650CT	P133	16MB	1 3GB	11 3 TFT	$5 200
660CDT	P150	16MB	1 3GB	10 3 TFT	$6 750
740CDT	P166	16MB	2 1GB	13 3 TFT	$8 700

[illegible]

Adaptec APA-1460 SlimSCSI Kit	$239 00
Altec Lansing AMC2830 8X CD-ROM w/Speaker	$545 00
3Com 3C589C TP Etherlink III PCMCIA	$183 00
3Com 3C562B Ethernet Combo+28.8 Modem	$575 00
3Com 3C562C TP Ethernet + 33.6 Modem	$415 00
Sigel Labs Audio Card 16 bit Sound	$2[illegible] 00
Sigel Labs SCSI-2 Adapter Card	$210 00
Sigel Labs PCMCIA 28.8K Cellular Ready	$285 00
IBM 14.4Kbps Modem + 10BaseT PCMCIA Card	[illegible]
IDEA 3270 PCMCIA Card w/Software	$479 00
IDEA C/SMM 5250/Plus	$430 00
Linksys DC to AC Power2Go	$72 00
Megahertz XJ10BT PCMCIA 10BaseT Ethernet	$146 00
Megahertz XJ10BC PCMCIA Ethernet Combo	$175 00
Megahertz XJ3336T 33.6 Modem + 10BaseT	$415 00
Megahertz CC3336T 33.6 Modem + 10Base2/T	$42[illegible] 00
Megahertz XJ4288M 28.8 X-Jack Cell Motorola	$33[illegible] 00
Megahertz CC4336 33.6 PCMCIA Modem	$32[illegible] 00
Megahertz XJ4336 33.6 X-Jack Modem	$320 00
Micro Solutions Backpack Parallel 4X CD-ROM	$31[illegible] 00
Micro Solutions Backpack 4X CD-ROM w/Sound	$45[illegible] 00
Micro Solutions Backpack Parallel 6X CD-ROM	$49[illegible] 00
New Media 28.8 WinSurfer Fax Modem	$1[illegible] 00
New Media BASICS SCSI Adapter HD	$119 00
New Media BASICS SCSI Adapter DB25	$119 00
New Media Bus Toaster PCMCIA to SCSI	$22[illegible] 00
New Media WavJammer Sound Card	$2[illegible] 00
New Media Toast N Jam Sound/SCSI	$489 00
New Media Zoom/Jammer PCMCIA [illegible]	$235 00
[illegible]	[illegible]

[illegible]

Targus [illegible] CN[illegible]	$43 00
Targus [illegible] CN20	$32 00
Universal Notebook Case CUN1	$[illegible]
[illegible] Notebook Case CCNT	$[illegible]
[illegible] 3 Notebook Case CFP3	$57 50
[illegible] Premier Notebook Case C[illegible]	$95 00
Convertible Backpack Case CCB	$[illegible]
Prestige Leather Case CLP1	$275 00
[illegible] Leather Case CEL1	$2[illegible] 00

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Continued from page 16

The new NEC Proserva family of scalable high-availability fault-resistant servers is based on Pentium and Pentium Pro chips and is aimed at the server needs of clients ranging from small workgroups to entire enterprises. The top-of-the-line model is the ProServa SH with up to four Pentium Pro 200 MHz processors, RAID option, seven hot swap bays, dual peer PCI bridges, dual peer fast and wide SCSI controllers, redundant power supplies, integrated I/O features, and NEC Enterprise Server Management and Intel LANDesk software. The mid range in the line, the ProServa PH has up to four 166 MHz Pentium processors, and the entry level Proserva V and V Plus models are based on either one or two Pentium 133 MHz processors —JE

MobilePro now available • As well, NEC displayed the production version of its new MobilePro HPC, a handheld PC running the Microsoft CE operating system. The MobilePro is based on an NEC V4101 processor with 8 MB of ROM and a 480x240 pixel grayscale display with a touch screen overlaid and a small keyboard. There are two models of MobilePro, the 200 HPC (with 2 MB of RAM), and the 400 HPC (with 4 MB of RAM). The preinstalled software (stored on ROM) includes MS Pocket Word, and MS Pocket Excel. As well there is a suite of utilities including an Address Book, Calendar, World Clock, To-Do List, Calculator and Solitaire game. Telecomm capability is built into Windows CE, and the MobilePro HPC has a built-in infrared port. Synchronization of data between the MobilePro and a PC is also supported —JE

Contact: NEC Tel: 800-456-8372.
Web site: http://www.nec.com

Tektronix Phaser 450 printer for high end graphics • Tektronix Inc. has unveiled the Phaser 450, a new A size (printed image area 9.3x12.7 in.), Adobe PostScript dye sublimation printer, for professional graphics printing. The Phaser 450 can output a letter-size page with full bleeds for pre-press proofing. A tabloid page can be printed out as two separate pages.

The Phaser 450 is fast. It can print out a true-color 300x300 dot per inch (dpi) page in a little over one minute. A new line of dye sublimation media has been developed for the printer which creates printed images that are almost indistinguishable from a photographic print. New ColorSeal laminating media is available to be applied over finished prints to help them resist ultraviolet (UV) fading and scratching.

For better pre-press proofing quality, the Phaser 450 takes advantage of the latest FujiProof Fuji Color Art proofing system, and a Photo profile has been added to the Tekcolor Dynamic Correction Software. Commercial press, EuroScale, publication trade MatchPrints, and newsprint profiles are also built in. To ensure image output remains consistent from one dye ribbon to the next, PhaserMatch calibration and matching tool allows users to create their own customer color profiles to suit particular printing presses and other devices to ensure more accurate comps and proofs. As well, the Phaser incorporates Tektronix's PhotoFine technology to help render continuous tone images.

The Phaser 450 is compatible with Windows, Mac, and UNIX computers, and can accept network interface cards compatible with EtherTalk, Novell NetWare, TCP/IP and LocalTalk. The Phaser 450 has a recommended list price of $9,995.

Contact: Tektronix, Tel: 800-835-6100, or 416-747-9771
Web site: http://www.tek.com/color_printers/

Sharp launches high performance notebooks • At the Comdex PacRim show, Sharp Electronics of Canada unveiled its new PC-9300T and PC-9300D notebook PCs, intended to "round out its offerings to corporate and home office users seeking the most features for the price," according to a company statement. The new products, part of Sharp's large scale re-entry into the North American notebook market, are based on the 150 Hz processor, with 16 MB of RAM, a 1.44 GB hard drive, 10x CD-ROM drive, IRDA-standard infrared port, a GlidePad pointing device, and 16-bit stereo audio.

The PC-9300T has an 11.3-inch SVGA active matrix screen that includes Sharp's Super High Aperture technology which the company claims increases brightness by 34 percent and reduces power consumption by 32 percent.

The PC-9300D has a 12.1-inch dual-scan screen with Sharp's Sharp Addressing technology which is designed to create a high-quality dual scan screen with no shadows or distortion, and a wider viewing angle than older DSTN screens.

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Contact: Sharp, Tel: 905-890-2100
Web site: http://www.sharp.ca

Lexmark's 2030 the first dual-cartridge printer under $300 • Lexmark Canada has introduced its model 2030 Color Jetprinter, a dual-cartridge inkjet printer for the home market. With 600x300 dots per inch (dpi) "edge sharpness," and up to 5 pages per minute (ppm) of draft black output, 4 ppm letter-quality black output, and 1 ppm color letter quality output, the 2030 is intended to meet the printing needs of a home office or family.

The printer is extremely simple to set up and operate. The 2030 has no status or control buttons, as all control and diagnostic displays are shown on the PC screen. The onscreen display provides clear graphic displays showing printing status, ink levels, and other information.

The ink cartridges available include a high-capacity (3,000 sheet) black cartridge with Super Sharp Waterproof ink, and a variety of color cartridges. There is a standard three color (cyan, magenta and yellow) cartridge, and a special near-photo quality cartridge, which has five ink colors including light shades of cyan and magenta. The extra shades allow for finer dot patterns and a better color differentiation, resulting in more natural flesh tones and improved color gradations and tonal ranges. The 2030 gives excellent quality print output on plain paper and up to "near-photographic" quality on specially coated stock.

The printer requires a bi-directional parallel cable (not included) and comes with a wide range of software, including the ColorFine 2 driver software compatible with Windows 3.1 and 95, and a vast amount of printing software on the Lexmark Workshop CD-ROM, including Monotype Greeting Card Maker, Certificate Maker, Softkey Labels Unlimited, Comic Creator and an Internet package. The Lexmark 2030 is widely available at an initial Canadian street price of about $299, which includes a one-year, LexExpress "next-business-day" exchange policy.—*JE*

Contact: Lexmark, Tel: 800-358-5835, or 905-477-2311
Web site: http://www.lexmark.com

Xerox Canada's "copier-like" network printers • At Comdex PacRim, Xerox Canada showed its new line of "digital office systems," some of which not only print files from networked PCs, but also offer a variety of "copier-like" features, including copying, scanning, faxing, sorting, and stapling. Xerox is aiming the DocuPrint 4512, 4517 and 4232 models at users requiring sophisticated document handling capabilities. The model 4512, in particular, is "the only laser printer in its class to offer advanced paper-handling, such as two-side printing, at no extra cost," according to Xerox.

At the exhibition, Xerox also announced a reorganization of its Canadian operations with the creation of a new position of manager of channel sales for the company's desktop printers unit. Maire Kushner, long known as a market innovator in the graphics and desktop publishing field during her years at Radius Inc., is now responsible for Xerox's retail printer products, including the DocuPrint laser printer line and the Xprint Plus color laser printer line.

Contact: Xerox, Tel: 416-733-6774
Web site: http://www.xerox.com

Canadian computer scientists get Academy Award • WATERLOO, Ont. (NB)—A scientist at Canada's National Research Council (NRC) and an adjunct professor at the University of Waterloo have jointly received a special award from the Academy of Motion Picture Arts and Sciences. Marceli Wein of the university's Computer Graphics Laboratory and Nestor Burtnyk of the NRC received the award for their work on computer animation. The award will be presented March 1 in Beverly Hills, as part of the academy's technical awards for 1996. It is for the two researchers' work in two-dimensional key frame character animation, which the academy said has influenced much later work in that field.—*Grant Buckler*

What's New is compiled by Jeff Evans, Keith Schengili-Roberts, Chris Fisher, Graeme Bennett, David Tanaka and Megan Johnston.

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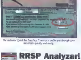

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Positive values focus of Atlantic Internet show

The technology industry started 1997 off with a bang in Canada, with three separate shows taking place in January: Internet World '97 in Toronto, Comdex/PacRim in Vancouver and the Atlantic Internet Show in Halifax. Even though technology, and more specifically the Internet, was a common theme, each show had its own flavor.

BY RALPH DECOSTE

The soul of Atlantic Internet was displayed in mid-January at the third annual Atlantic Internet Show, held at Halifax's World Trade and Convention Centre.

The theme of the show, organized by a non-profit group and focusing on the positive possibilities, was family values.

Keynote speaker, Peter MacPherson, said the Internet is the "strongest, brightest and fastest tool for bringing ideas into the home."

MacPherson is a Maritime Tel & Tel employee but emphasized that the views expressed during his speech were his own and not those of his employer.

He said the Internet "has its problems and that the media is always taking pot shots at the Internet." He said there were concerns that his topic implied censorship, but what he was really talking about was "Net sense and common sense."

According to MacPherson, 80 percent of 27,000 newsgroups surveyed would not be "in keeping with family values." He said that this problem originates from the fact that "one can hide oneself in the Internet."

MacPherson was particularly critical of the Internet relay chats (IRCs), which he likened to the popularity of citizens band radios in the late 70s.

"If there was one area that should be banned, this [IRC] is it," MacPherson told his audience. He said the IRCs were valuable for information and support groups, but contended that this represented a very small portion of chat group activity.

In making sure the Internet is kid-safe, MacPherson suggested parents consider software—Net Nanny, Cyber Sitter and Cyber Patrol were three he named—to block access to undesirable sites.

But, according to MacPherson, sensible family oriented Internet use is more than a matter of software tools. He said two very strong tools are not on the Net: parents spending time with their children exploring the Internet, and getting the computer out of the basement and into the family room.

When interviewed after his presentation, MacPherson, said he felt the Internet could make a significant contribution to mankind and he hoped his talk would help to counter some of the "bad press" the Internet was receiving.

Another Internet Show attendee, Sgt. Bill Cowper shared some of MacPherson's views.

Cowper is the Internet communications officer with the Halifax Regional Police Service. He said the members of the news media were always looking for interviews on the negative aspects of the Internet. "We have a moral upright society. Let's not talk about the dark side. Let's talk about using the Internet for crime prevention, job opportunities and for things like the Ability Network."

Several other show participants also reinforced the positive possibilities of Internet communication.

Paas Langille of the Ability Network described how an Internet Web site was serving as networking tool for Entrepreneurs with disabilities.

The Internet has also been a valuable tool in the North American Missing Children's Association's efforts to transmit photos of missing children to as many eyes as possible, according to the group's assistant director, Cheryl Ivany. She sees the Internet postings as a complement to the association's other efforts, such as displaying pictures in shopping malls.

Pictou County's Jo Sutton uses the Internet in creating Women'space, a women's issues magazine. She works with other editors in Winnipeg, Calgary and Vancouver, who she says with a smile, "have never met."

Sutton described the Internet as an "impressive connection between people and ideas." She cited Studio XX of Montreal as an example of how women are using the Internet. Studio XX is a digital media centre that offers "forums for discussions on topics such as women and technology and offer a space where technological knowledge can be shared and applied to various art practices."

Organizations online

Governments are also realizing the value of online communication, and at the Halifax show the Human Resources Development Canada was trying to help people with its new Web site. Chris Dawson, who designed and implemented the Web site, said it will contain job opportunities, labor market information, as well as information on job trends and links to similar sites in British Columbia and Ontario.

A number of non-profit organizations were among the 40 exhibitors at the show. This was made possible by the organizers who donated unsold exhibit space to organizations such as the YMCA and the Boys and Girls Clubs. Show organizer Roswell James said, "this is how the Internet will benefit the community."

James, who is the driving force behind the show and the non-profit Internet Coffee Club from which the show originated, said "we are here to educate and serve the community."

James believes this community-centred approach is distinctly Atlantic Canadian. "I'll bet that if this show was in Toronto it would be based entirely on the commercial applications of the Internet," James said.

He described the Internet as "such a useful tool, while all people are hearing is the negative side."

He was so positive about the Internet that an associate at the show asked, "Are you real?" James responded that there is "so much good on the Net, someone has to say it."

James is saying it and doing it. The Internet Coffee Club, which organizes the show, donated $1 000 from the profits of the 1996 show to the IWK Children's Hospital in Halifax. This year, organizers plan to donate a Pentium computer system to the Boys and Girls Club of Nova Scotia.

Ian MacArthur of the Boys and Girls Club said the donation "would give the youth the opportunity to reach their potential."

In organizing the show, James had the help of the students of the I W Akerley Campus of the Nova Scotia Community College. The students sold exhibit space, looked after marketing and arranged speakers and seminars. Student Jackie Zorychta said the show was an extra-curricular project but "it turned into something a lot bigger. It became part of the course."

James said it was a "school project, but it was a real event, with real time lines and real pressures." He said the students also brought "fresh ideas to the show."

James, who operates Roswell Computer Books, is modest about his contribution. He said his business was the only real "online store of its type in the Maritimes. Part of our recognition is because of the Internet, so our success is based on the Internet."

"The Internet has profited our business," James said. "And any business that is successful has an obligation and I am happy to put something back into the community." ❑

Ralph DeCoste is a computer trainer/consultant and freelance journalist based in Eastern Nova Scotia. He can be contacted at rdecoste@atcon.com or rdecoste@fox.nstn.ca

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Online services change to meet ISP threat

Content, core customers and speed targeted

BY JEFF EVANS

At the recent Internet World 97 show in Toronto, the battle for the hearts and minds of Internet users was in full swing, with the traditional giants of online services, CompuServe and America Online (AOL) promoting their new, Web-enabled incarnations against the surging new Internet service providers (ISPs), such as Netcom and DirecPC. The threat from the Web is real.

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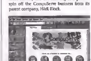
Both local BBSes and international online services have taken heavy hits as many online service customers bailed out of their traditional relationships and went surfing on the Web. Once-major services have died spectacularly in the last year or so: Prodigy pooped out and Genie disappeared in a puff of smoke.

CompuServe: They weren't exactly "WOWed"

CompuServe, which for many years had been the flagship of the pre-Internet online service industry had a bad year in 1996—stalled subscriber growth, financial losses, the cancellation of the much-hyped "WOW" entertainment service, and the shelving of a plan to spin off the CompuServe business from its parent company, H&R Block.



According to William Truesdale, CompuServe's international marketing director, the growth of the Internet and especially the World Wide Web has now prompted CompuServe to undergo a strategic change of direction. The company is committed to both completely re-engineering its service as a fully Web-compatible, hypertext markup language-based (HTML-based) system, and to refocus its efforts on areas where it is strong. In a way this reinvention of CompuServe will try to bring the company's offerings back to its roots—providing information and communication services for "people who have a need, versus people who have a want," or in other words, critical services for the professional.

The business/technical/professional computer user will once again be the core of the service. The existing content and forums will stay but will be marketed more narrowly than in recent years. Spending a couple of hundred million dollars in marketing and advertising to attract an additional million subscribers did not prove to be a sustainable effort. Future CompuServe advertising will attempt to target core professional audiences, such as business professionals and educators.

Although CompuServe's subscriber numbers are flat in North America, the company is still growing very rapidly in Asia and Europe, where most of the new customers are mainly interested in the professional forums and services. The very successful Japanese operation, run by a Japanese partner and called NiftyServe, will soon face competition from an AOL partnership with another Japanese firm.

Over the next few months, CompuServe will begin the migration of its system over to HTML. As part of that transition, a new Web-browser-oriented user interface will be adopted, and the structure of existing content, including Canadian content, will be reorganized.

Truesdale is optimistic that a significant turnaround can be achieved by the middle of 1997. He is confident of CompuServe's inherent strengths, including its technical capabilities, the loyalty of its long time subscriber base, and its strategic alliances with companies such as Microsoft.

AOL: Main street meets MuchMusic
The one online service that has, so far, cheerfully defied the competition from the Web is America Online, which has seen membership surge past CompuServe's to the point where there are now over seven million AOL subscribers worldwide.

According to Stephen Bartkiw of AOL Canada, in the eight months since AOL Canada was launched, it has attracted over 100 000 new subscribers (this compares well to the largest Canadian ISPs, such as iSTAR and Sympatico). In the mid term, AOL hopes to grow the Canadian subscriber base to 10 percent of the base in the United States, or over 500 000 users, which would make it by far the biggest Canadian online service. In the long term, AOL would like to expand into non traditional markets and be ready to take advantage of any new technologies that would make the Internet accessible to the mass market. AOL has tried to provide a spectrum of services that appeals to the "technology tier" of the population (the adept PC user), but which also offers a great deal for the average consumer.

AOL has introduced a localized Canadian version of its software, in which AOL Canada offers 13 Canadian "channels." AOL emphasizes its Canadian partners, such as CITY TV and MuchMusic, with an appealing mix of entertainment-oriented graphics and stories. AOL has attempted to combine growth with financial health by developing several revenue streams: subscriber usage fees, advertisements and sponsorships, cooperative marketing, and online commerce.

One challenge for AOL has been to provide a good online experience for computer users who have older PCs and slower (14.4 Kbps or less) modems. The company runs constant "loyalty labs," where subscribers are encouraged to describe what they want from an online service. New members report that they need help initially finding their way through the vast amounts of data available online to the particular things they want.

If they can't do this reasonably quickly and pleasantly, then there is a high probability that they will contribute to membership "churn," the drop-off of new subscribers who have had an unsatisfactory online experience. One area where AOL has been working hard to increase customer satisfaction is in providing more local phone connection sites ➤

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At the moment about 70 percent of Canadians have local access to AOL and a toll-free service is available For the power user AOL will increasingly offer high-speed (ISDN) options. Bartkiw expects that online gaming will increase in popularity and that the proportion of subscribers with high powered PCs and fast modems in the AOL user base will steadily increase AOL's challenge will be to develop appealing, cool leading-edge content in conjunction with its partners, while still remaining accessible to an ever-widening audience.

One heartening development, according to Bartkiw is that two years ago the AOL subscriber base was 90 percent male and only 10 percent female Now, is is a more balanced 60 percent to 40 percent respectively Much of AOL's growth has come from providing an environment that is appealing to women as well as men. AOL has instituted parental control options to make children's surfing of the Web less risky If AOL can continue to attract subscribers to its wide array of "communities of interest," it might even reach its hoped for target of 10 million users in 1997

Netcom goes into warp speed
Netcom Canada, the local branch of Netcom, the largest ISP in the world (with about 600 000 members), has received the benefit of the excitement surrounding the new US Robotics high-speed X2 technology Unlike the traditional online services, or even many other ISPs Netcom Canada started out with state-of-the-art Web server technology and it standardized on US Robotics modems. So, when X2 was announced, Netcom and its subscribers were both unusually well placed to take immediate advantage Netcom had one of the busiest exhibits at the Internet World show

DirecPC: A thriving market for high-speed services predicted
DirecPC's Brad Poulos in conversation with *TCP*, outlined the ways his company's satellite Internet service is meeting a need, by businesses and schools, for a high-speed Internet service that isn't dependent on cable or phone lines for fast download capability

The DirecPC solution consists of a small format satellite dish that is connected to an interface card in the subscriber's PC, plus a

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17" Sceptre Monitor, $680 15" Sceptre Monitor, $375 Ergonomic

Bare Systems (PCI)

☐ Pentium 200MHz	$1040
☐ Pentium 166MHz	$785
☐ Pentium 150MHz	$665
☐ Pentium 133MHz	$575
☐ Pentium 120MHz	$495
☐ Pentium 100MHz	$470
☐ Pentium 75MHz	$455
☐ AMD DX4 133MHz	$380
☐ AMD DX4 120MHz	$350
☐ AMD DX4 100MHz	$340
☐ AMD DX2 66MHz	$330

Includes:
(assembly included)

Cache	256K (PL for Pentium)
Memory	4MB
Case	13" Mini Tower (200W)
Keyboard	Win 95
Floppy Drive	1 44MB

Options:

☐ To 512K Cache (Pentium only)	$20
☐ To 8MB(586 2x4MB)	$25
☐ 16MB(586 2x8MB)	$48
☐ 32MB(586 2x16MB)	$168
☐ To Mid-Tower 15"	$5
☐ Midi Tower 19"	$20
☐ Full Tower 25"	$42

CPUs

☐ AMD 486 DX2-66	$Call
☐ AMD 486 DX4-100 / 120 / 133	$Call
☐ AMD K5 100 / 133 / 166	$Call
☐ Cyrix / IBM 6x86 150+ / 166+	$Call
☐ Pentium 75 / 100 / 120 / 133 / 150	$Call
☐ Pentium 166 / 200	$Call
☐ Pentium Pro 180 / 200	$Call
☐ Pentium MMX 166 / 200	$Call

Memories

☐ 1M 30pin	$Call
☐ 4M 30pin	$Call
☐ 4M 72pin	$Call
☐ 8M 72pin	$Call
☐ 16M 72pin	$Call
☐ 32M 72pin	$Call
☐ 4M EDO 72pin	$Call
☐ 8M EDO 72pin	$Call
☐ 16M EDO 72pin	$Call
☐ 32M EDO 72pin	$Call

MotherBoards(no CPUs)

☐ 486 256K PCI 72p	$107
☐ Giga-byte ATV 256K	$155
☐ Asus T2P4 HX 256K	$193

Video Cards

☐ ATI Video Expression PCI 2M	$100
☐ ATI TV tuner ISA	$139
☐ ATI 3D PCI 2M OEM	$165
☐ Cirrus Logic 5429 VLB	$50
☐ Cirrus Logic 5446 PCI	$50
☐ Diamond Stealth PCI 2MB	$107
☐ S3 Trio 64+ PCI 1MB	$54
☐ S3 3D VIRGE PCI 2MB	$87
☐ Matrox Mystique 2MB SGRAM	$234
☐ Matrox Mystique 4MB SGRAM	$345
☐ Matrox Millenium 2MB WRAM	$249
☐ Matrox Millenium 4MB WRAM	$365
☐ Trident 8900CL 1MB	$59
☐ Trident 9680 PCI	$49

CD ROMs

☐ Acer 8x	$134
☐ Acer 10x	$165
☐ Creative Labs 8x	$145
☐ NEC 8x	$140
☐ Panasonic 12x	$168
☐ Pioneer 10x	$165
☐ Pioneer 12x	$170
☐ Toshiba 8x	$158

Hard Drives

☐ Quantum 1 2G	$265
☐ Quantum 1 7G	$297
☐ Quantum 2 1G	$375
☐ Quantum 2 5G	$400
☐ Quantum 3.2G	$420
☐ W D 1 2G	$267
☐ W D 1 6G	$292
☐ W D 2 1G	$337
☐ W D 2.5G	$375
☐ W D 3 1G	$415

Floppy Drives

☐ Fujitsu 1 44MB	$30
☐ 1 2MB	$68

Tape / Drive devices

☐ Colorado T1000 810MB Internal	$165
☐ Zip Drive parallel Ext.	$250

Keyboards

☐ Win 95	$19
☐ Fujitsu 8725 104 key	$30
☐ Fujitsu 4725 104 key	$57
☐ M S Natural keyboard	$89
☐ Ergonomic keyboard	$55

Fax / Modems

☐ Supra Express 33 6 Int	$125
☐ US Robotics 33 6 Int.	$150
☐ US Robotics 33 6 Ext.	$225
☐ US Robotics 28.8 w/ voice full Int.	$165
☐ US Robotics 28 8 w/ voice full Ext	$258

Cases(with Power supply)

☐ Desktop	$60
☐ Full Tower 25"	$98
☐ Midi Tower 19"	$60
☐ Mid Tower 15"	$53
☐ Mini Tower 13"	$49

Mice

☐ Logitech serial	$27
☐ Logitech PS/2	$33
☐ MS 2 button 3 mouse serial	$35
☐ 2 button serial mouse	$7

Monitors

☐ Acer 15" 56E	$400
☐ Acer 17"	$735
☐ ADI 4V 15"	$435
☐ ADI 5V 17"	$750
☐ Daytek 14"	$270
☐ Daytek 15" DT-1536A	$345
☐ Daytek 15" digital DT 1531	$360
☐ Daytek 17"	$670
☐ Magnavox 14"	$265
☐ Proview 14"	$250
☐ Sceptre P51, 15"	$375
☐ Sceptre P73 17"	$680
☐ Other model ______	$Call

Printers

☐ Canon BJC-240	$249
☐ Canon BJC-4100	$310
☐ HP 680C	$395
☐ HP 820cxi	$520
☐ HP 870cxi	$645
☐ Epson stylus color 500	$383
☐ Other model ______	$Call

Sound Cards

☐ Acer soundcard FX 16	$43
☐ Acer soundcard AW32 Pro	$74
☐ SoundBlaster 16 PNP	$87
☐ SoundBlaster 32	$140
☐ SoundBlaster AWE64	$260

Network Cards

☐ PnP NE2000 Combo PCI	$50
☐ PnP NE2000 Combo ISA	$35

Others

☐ Microphone	$7
☐ Headphone with mic., vol control	$13
☐ Speaker Box (amplified 60W)	$20
☐ Speaker Box (amplified 130W)	$50
☐ Win 95 CD Full w/ new system	$125
☐ Accpac GL.	$275
☐ Internet Access package	$12

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regular analog modem attached to a phone line. Outbound data is sent from the PC via the modem to a "teleport," a server and satellite ground station. Inbound data is transmitted from an Anik satellite at 400Kbps (about three times ISDN speed) to the subscriber's dish. The result is a high-speed-download Internet service that can be supplied to virtually any location in Canada.

DirecPC has proven popular with subscribers in every province including many businesses who want better Intranet performance than local land-based services offer and many schools. According to Poulos the number of subscriptions are running ahead of projections, and a recent major price drop in the cost of the system (from about $1,000 to about $600), has made the cost of entry less of a barrier. Further economies of scale as the subscriber base grows, and the introduction of smaller satellite dishes (made possible by the impending launch of a new generation of higher powered satellites) will allow prices to decline even further, and allow T1 speeds to be reached. Poulos believes that the insatiable demand for high-speed Internet services will lead to lots of room in the market for specialized services like DirecPC.

As the number of individuals and enterprises going online blossomed in the last few years, great new opportunities have opened up for service providers. However, the number of players who have jumped into the ISP field has meant that competition has been fierce, and profits elusive. In such an environment, success seems to be going to those companies that truly understand what customers want and need and are prepared to use appropriate technology to provide high quality, high value service to the Canadian online community ❑

Contact:

Netcom Canada
Web site: http://www.netcom.ca/
CompuServe,
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AOL Canada
Web site. http://www.aol.ca/
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We know your computer is important to you.

CPUs
AMD 486
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72pin 4M / 8M / 16M / 32M
72pin EDO 4M / 8M / 16M / 32M
SOJ video card memories
Cache upgrade
MotherBoards
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Quantum
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Tape Drives, Zips, Jazzes
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Ergonomic keyboard
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FRONTIER'S UPGRADABLE SYSTEM

Entry Level

Pentium® -100 Mhz $982

- 256KB Pipelined Burst Cache Triton 430VX, Support SDRAM
- Ball Bearing Spring Mount CPU Cooler
- 8MB 60ns EDO RAM Exp. 128MB
- 1.28GB EIDE hard drive Mode 4
- 3.5" 1.44MB floppy disk drive
- PCI EIDE w/2x16550UART Serial 1xBi Directional Parallel
- Cirrus Logic 5446 64bit Graphics Card, 1MB DRAM Exp. 2MB
- 14" 1024x768 N.I. L.R. 28dpi
- 14" Mini-tower case with 200W
- Logitech 2B mini mouse
- 104 Windows 95 Keyboard
- Two years parts & labour limited warranty

Full Screen MPEG

Performance

Pentium® -133 Mhz $2028

- 256KB Pipelined Burst Cache, Triton 430VX Support SDRAM
- Ball Bearing Spring Mount CPU Cooler
- 16MB 60ns EDO RAM Exp. 128MB
- 2.1GB EIDE hard drive Mode 4
- 3.5" 1.44MB floppy disk drive
- PCI EIDE w/2x16550UART Serial 1xBi-Directional Parallel
- [illegible]
- SONY 15" 15SX N.I.L.R. 1280 x 1024 .25dpi
- 15" Mid-tower case with 200W CSA Power Supply
- Logitech MouseMan 3B mouse
- 104 Windows 95 Keyboard
- 8X EIDE CD ROM drive
- Soundblaster 16bit PnP (Creative)
- Stereo Speakers (60W)
- ***Microsoft Windows95 2CD with Manual***
- Two years parts & labour limited warranty

16MB EDO 2.1GB HD SONY 15SX Monitor

Power Plus

Pentium® -166Mhz MMX $3284

- ASUS P55TVP4 P II 256KB Cache Triton 430VX Support SDRAM
- Ball Bearing Spring Mount CPU Cooler
- 32MB 60ns EDO RAM Exp. 128MB
- 3.2GB EIDE hard drive Mode 4
- 3.5" 1.44MB floppy disk drive
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- MGA Millennium 3D MPEG, Graphics w/ 2MB WRAM Exp. 8MB
- Viewsonic 17" 17GS N.I.L.R. 1280 x 1024 .27dpi
- 15" Mid tower case with 200W
- Microsoft V2.0 2B mouse
- 104 Windows 95 Keyboard
- 12X EIDE CD-ROM drive
- Soundblaster 32 PnP W/wavetable
- Multimedia Stereo Speakers JT160-A w/Bass Control
- USR 33.6 V34 Voice Fax/Modem Internal
- ***Microsoft Windows95 2CD with Manual***
- Two years parts & labour limited warranty

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Intel P120	$1006
Intel P133	$1073
Intel P150 / IBM P150+	$1136 / $1043
Intel P166 / IBM P166+	$1305 / $1096
Intel P200	$1566

Intel P100	$1937
Intel P120	$1961
Intel P150	$2091
Intel P166 / Intel P166 MMX	$2260 / $2386
Intel P200 / Intel P200 MMX	$2541 / $2706
Pentium Pro - 180Mhz ATX	$2822
Pentium Pro - 200Mhz ATX	$3052

Intel P120	$2849
Intel P133	$2916
Intel P150	$2979
Intel P166 / Intel P166 MMX	$3158 / $3284
Intel P200 / Intel P200 MMX	$3439 / $3598
Pentium Pro -180Mhz ATX	$3653
Pentium Pro - 200Mhz ATX	$3883

Software at Cost !

Purchase a Frontier computer system and buy up to 10 software titles at cost. (limited selections)

First Aid 97 Deluxe
Oil Change
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Dark Reign The Future of War
Mechwarrior 2 Mercenaries
You Don't Know Jack XL 2
You Don't Know Jack Sports
Outlaws
Star Wars Yoda Stories

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X Wing vs Tie Fighter
Archives II Star Wars
Leisure Suit
Larry 7 Yankers
Nascar II

Phantasmagoria 2
Lord of the Realm II
Civilization II
Grand Prix II
Command and Conquer
etc

BEST VALUE NOTEBOOKS

TOSHIBA

200CDS - P100/8MB/810MB/11.3" 6X CD DSTN	$2325
430CDS - P120/16MB/1.3GB/11.3" DSTN 10X	$2908
430CDT - P120/16MB/1.3GB/11.3" TFT 10X	$4265
500CDS - P120/16MB/1.3GB/12.1 DSTN	$3230
510CDT P120/16MB/2.1GB/12.1 TFT 10X CD 28.8M	$6587

IBM

TP365XD - P120/8MB/1.0GB/11.3" DSTN 4X	$2999
TP560 - P120/8MB/810MB/12.1" TFT ...	$3995
TP760EL - P133/16MB/1.08GB/12.1" TFT	$5995
TP760ED P133/16MB/1.3GB/12.1" TFT 6X CD	$6808

NEC

Versa2400 - P100/16MB/1.0GB 11.3" DS 6X CD	$2595
Versa2430 P133/16MB/1.0GB/11.3 DS 6X CD	$2998
Versa6030H P133/16MB/1.3GB/12.1" 6X CD	$5285

TEXAS INSTRUMENTS

Extensa570CD - P100/8MB/810MB 11.3" DSTN	$2561
Extensa570CDI - P100/8MB/1.2GB 10.4" TFT 6X CD	$3749

Faronics

LEO 3500 P133/16MB/1.3GB 12.1" TFT 10X CD	$4406

MONTHLY SPECIALS

Kodak
DC50 Zoom Camera
Add pictures to your documents in a flash!
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DIAMOND
Monster 3D 4MB PCI
Killer 3D for your PC!
$315
plus $25 rebate

Quantum
Fireball TM 3.2/3.8GBHD
10ms 128k 5400RPM
Hot!!
$389/$440

MATROX
Mystique 3D Video Card 2MB / 4MB
3D Entertainment
$185/235

U.S. Robotics
USR 33.6Voice Fax PnP Modem
Full Duplex SVD Smart Ring
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$158

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Get ready for a multimedia computing experience so powerful, you may have to fasten your seat belt. With the new Ready 9600 Series, NEC introduces high-end multimedia as it was meant to be. Blazingly fast. Breathtakingly vivid. And so easy to use, it's practically instinctive.

Configurations:

Ready 9620 Pentium 133, 16MB EDO RAM 1.6GB HDD	$2185
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Ready 9626 Pentium 200, 16MB EDO RAM, 2.5GB HDD	$2885
Ready 9627 Pentium 166, 32MB EDO RAM 2.5GB HDD	$2800
Ready 9628 Pentium 166 32MB EDO RAM 3.2GB HDD 100MB ZipDr.	$3148
Ready 9629 Pentium 200, 32MB EDO RAM 3.2GB HDD	$3148

Features:

- 256KB Synchronous Burst Pipline Cache
- ATI Rage GT 3-D 64 Bit PCI 2MB Video EDO DRAM standard upgradeable to 4MB
- 16 Bit, 3-D Wavetable Surround Sound
- 33.6/14.4Kbps data/fax/voice modem
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- Window 95 enhanced keyboard 104 key
- NEC/Microsoft 2 button mouse
- NEC's adjustable, stand-alone microphone
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MOTHERBOARD

ASUS

P/I-P65UP5 15[illegible]	$779
P/I-P6NP5 150-200Mhz PB256K (Pentium Pro, Natoma)	$300
P/I-XP55T2P4 75-166Mhz PB256K (430HX) Triton2 ATX	[illegible]
[illegible]	$195
P/I-P55TVP4 75-200Mhz PB256K 430VX Support SDRAM	$178

intel

Venus Pentium Pro 150-200Mhz 440FX ATX	[illegible]
440/Pentium 75-200Mhz Triton II 430VX ATX Style	$108

TYAN

Titan-Pro(S1662) 150-200Mhz Dual Pentium Pro (440FX)	[illegible]
Tomcat II(S1562D) 75-200Mhz PB256K Dual Pentium	$335
Titan (S1470) 75-200Mhz 430VX PB256k SDRAM	$215
Pentium686 75-200Mhz PB256K (430VX) SDRAM	$178

CPU & MEMORY

intel

Pentium Pro [illegible]	$758 / 970
Pentium P166 / P200 MHz (MMX) NEW!!	[illegible] / 820
Pentium P166 / P200 MHz	$490 / 725
Pentium P133 / P150 MHz	$230 / 295
Pentium P100 / P120 MHz	$180 / 300

[illegible]

6x86-P150+ (120Mhz)	$179
6x86-P166+ (133Mhz)	$236
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32MB 72 pin 70ns EDO 32MB 72 pin 60ns	$Call
SDRAM 16MB/32MB/64MB	$Call

MASS STORAGE

Seagate

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ST31276A 1.2GB / ST31621A 1.6GB	$262 / 310
ST32120A 2.1GB / ST32530A 2.5GB	[illegible] / 370

SCSI

ST32171W 2.1GB 8ms 512k 5400rpm	$750
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ST32550N 2.1GB / ST32550W Wide 2.0GB	[illegible] / 1050
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ST34371N/U 4.2GB / ST34371UW Wide 4.2GB	$1400 / 1570

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IDE

Fireball TM 1.2GB / 1.6GB 14ms 128k	$276 / Call
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SCSI

Fireball 2.5GB SCSI (NEW)	[illegible]
Atlas 2.0GB SCSI / 2.0GB Wide	$815 / 875
Atlas 4.3GB SCSI / 4.3GB Wide	$1345 / 1395

IBM

IBM [illegible] DJAA-31700 2.1GB	[illegible]

Western Digital

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W.D. AC32100 2.1G / AC32500 2.5G	[illegible] / 380
W.D. AC33100 3.1G / AC34000 4.0G	[illegible] / 545
W.D. E2176-0003 2.17G U SCSI 8ms 7200rpm	[illegible]
W.D. E2176-0001 2.17G UW SCSI 8ms 7200rpm	[illegible]
W.D. EA380-0003 4.36G U SCSI 8ms 7200rpm	$1270
W.D. EA380-0007 4.36G UW SCSI 8ms 7200rpm	$1440

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Zip Drive 100MB Internal (Incl. SCSI Adapter) Plus $50 Rebate	[illegible]
Zip Drive 100MB Parallel (29ms 20MB/min) Plus $50 Rebate	$255
Zip Drive 100MB SCSI (29ms 60MB/min) Plus $50 Rebate	[illegible]
Zip Disks 100MB Single Cartridge / 10 Pack	$16 / 160
Jaz Drive 1G SCSI Int. / Ext (12ms 6.6MB sec)	[illegible] / 635
Jaz Disks 1GB Single Cartridge / 5 Pack	$109 / 515

YAMAHA

Yamaha CDE102 4X/4X W CD-Recorder Int/Ext	[illegible] / 1250

CREATIVE

Creative Blaster CDR-4210 Recorder 4X/2X W	[illegible]

Panasonic

Panasonic 7501B 4X/2X Write SCSI Card Software Int./Ext.	$715 / 800

HEWLETT PACKARD

SureStore CD-Writer 6000 [illegible] Int (Incl Software)	$775
SureStore CD-Writer 6020es 6X/2W SCSI Ext. (Incl Software)	$1050
Memorex / Sony CD-Writer Media Single	$10 12

TAPE BACKUPS

[illegible]

T1000 800MB Travan w/tape Int. / Ext.	$225 / 230
Jumbo 1.4GB 1.4GB Int.	[illegible]
T4000 4GB Travan Int. (QIC3095)	$325
TAPE 3M TR-1 400MB/MC3000XL	$30 / 38
TAPE 3M TR-3 1.6GB / TR-4 4.0GB	$40 / 50

CONNER

Tape Star 4-800 (QIC3080) [illegible] Int. w/tape	[illegible]
Tape Star 4-800 (QIC3095) [illegible] Ext. w/tape	[illegible]

IOMEGA

Ditto Easy 800MB Int. / Ext.	$180 / 300
Easy 2GB Tape Drive Int / Ext / 15MB/min	$214 / 280
Ditto 3200 3.2GB Int. / Ext.	$260 / 370

[illegible]

ATI

Winboost M64 1MB Exp. 2MB / 2MB DRAM	$95 / 100
3D XPression + 4MB PC2TV (NEW!!) w/TV output	[illegible]
3D XPression + 2MB Ext. 4MB w/o TV output	$130
3D Pro Turbo 4MB SGRAM / [illegible]	[illegible] / 480
TV Tuner	$145

DIAMOND

Stealth64 3D 2240 2MB Exp. 4 (EDO) DRAM (Mosaic)	$130
Stealth64 3D [illegible] 4MB VRAM	[illegible]
Monster 3D 4MB EDO RAM (Add-on Card) / [illegible]	[illegible] / 315

MATROX

Mystique PCI 3D 2MB + SGRAM / 4MB + SGRAM	$180 / 236
Millennium MIL/2M [illegible] PCI 2MB WRAM	$290 / 350
Millennium MIL/4M [illegible] PCI 4MB WRAM	[illegible] / 380
Millennium Media XL/Media XL MPEG	$250 / 415
MTA TV Tuner Board	$140

[illegible]

Dynamite 128/Video [illegible] DRAM 4MB	$178 / 300

CIRRUS LOGIC

PCI 5446 MPEG 64bit 1MB Exp. 2MB	$50
S3 Trio V64 + 64bit 1MB Exp. 4MB	$69

MODEM / PCMCIA

MOTOROLA CELLULAR

ModemSurfr 33.6 V.34 w/fax & Int/Ext	$179 / 208
BitSURFR pro ISDN Ethernet Adapter	[illegible]

MEGAHERTZ

PCMCIA Ethernet Lan Adapter 10Base-T & 10Base-2	$180
PCMCIA [illegible] Modem [illegible] Cellular	$325 / 349
PCMCIA [illegible] 28.8 Modem + 10Base-T Combo	$430

3COM

PCMCIA OEM-3881 modem [illegible]	$300

SUPRA

SupraExpress 28.8 V.34 w/fax & voice PnP Int. / Ext.	$139 / 215
SupraFax 33.6 V.34 w/fax & caller ID flash Int. / Ext.	[illegible] / 276

U.S. Robotics

Sportster 33.6 V.34 w/fax PnP Int. Ext	$148 / 226
Sportster [illegible] 33.6 V.34 w/Full Duplex Int./Ext.	$159 / 300
Pilot 1000 5000	$299 / 377
Sportster/Courier ISDN 128k Int.	$389 / 720

PRINTER

brother

Laser Jet HL730DX 600dpi 6ppm	$443
Laser Jet WL-900 (Windows Only) Limited Quantity	[illegible]
Laser Jet HL760DX 1200dpi 6ppm	[illegible]

Canon

BubbleJet BJC240 Color (Win) / BJC 4100 Color	[illegible] / 300
BubbleJet BJC [illegible] Color (11x17)	[illegible]

EPSON

DeskJet Stylus 200 Color	[illegible]
DeskJet Stylus Pro / Stylus Pro XL	$540 / Call

HEWLETT PACKARD

DeskJet 680C 690C (New)	[illegible] / 400
DeskJet 820Cxi / 870Cxi	$530 / 580
LaserJet 5L 600dpi 4ppm 1MB	[illegible]
LaserJet 6P 600dpi 4ppm 2MB	[illegible]
LaserJet 6MP 600dpi 4ppm 4MB	$1,486
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LaserJet 5N 600dpi 12ppm 4MB w/jetdirect card	$2,080
LaserJet 5M 600dpi 12ppm 4MB w/PS	$2,480

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ADI

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MicroScan 5V 17" .28mm N.I. L.R.	$778

[illegible]

DX1795 17" / [illegible] 17" .26mm 1280x1024	[illegible] / 945

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[illegible]	$1050

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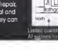

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Consumer focus at Comdex/PacRim

BY ROD LAMIRAND

The first of three Comdex events in Canada this year, the PacRim show in Vancouver was dominated by one thing—the Internet. Gray clouds and mild rain wreathed the sails of the Vancouver Trade and Convention Centre in Vancouver, B.C. for the three-day event in late January. More than 30,000 attendees (according to estimates by show organizer Softbank, at the end of the show) left the slick, city streets to roam the 160,000 carpeted square feet of barkers, buskers and booths.

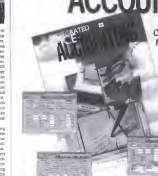
Front and centre at the show the battle of the ISPs (Internet service providers). iStar Canada the regional Sympatico service, Internet Direct AT&T and others dominated floor space vying for attention while America Online and CompuServe sought to portray themselves as Internet access providers too. Wedged in between, modem maker US Robotics demonstrated their 2x technology while Creative Labs proved once again that they lead rather than follow in the audio and video add-on department. Their Video WebPhone drew many observers, It looks like video Internet is about to become a reality.

As usual, the printer makers were battling it out. Lexmark was very keen to show its new four-ink color inkjet, the first to retail below $300. The Lexmark 2030 can even do six colors with a special Polaroid cartridge—the output is absolutely amazing, a must see. Canon and HP were also duking it out over the profitable home inkjet market with ever better inkjets of their own but Epson was winning the day by giving attendees a mouse pad with their own picture on it. Using the Epson digital camera and/or one of their scanners the extremely patient reps proved Epson's slogan, "Capture it, Scan it Project it Print it."

Over at the monitor battles Samsung and DayTek were proving that the cathode ray tube (CRT) has remained virtually unchanged forever and that liquid crystal display (LCD) monitors remain, for the most part, a novelty. If you have a spare $18,000, you can buy a 43-inch monitor (1,200x1,000 at a refresh rate of 60 times a second).

Around and about the show floor, palmtops were a hot item. NEC was eager to push its MobilePro HPC a hot little PC companion of its own design and manufacture that uses

Continued on page 37



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Comdex/Pacrim

Continued from page ***35***

the new Windows CE operating system Still not convinced about the new mini operating system from Redmond Sharp was displaying a new Zaurus 3500 with 2 MB RAM, a built-in 14.4Kbps modem and a back-lit display that sticks with the company's tried and proven operating system. This little device will give the CE machines, like the Cassiopeia, a run for their money Palmtops may be the real story this year.

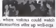
Over at the Apple booth, OS 7 6 was living beside a machine running the NeXt operating system The recent purchase has left no time for any work so the display would have to be described as a sneak preview for Mac-o-philes. All the talk though was of system 7 7 and 7.8.

An interesting video-editing program called Avid was one of the items showcased, as well as an education-oriented laptop The cool looking E-mate is basically an infrared-aware, clam-shaped, Newton with a translucent case I liked it.

Noticeably absent from the floor were IBM, NEC and Digital Equipment Corp (DEC) NEC's spokesperson said that they were re-evaluating their focus and found the use of hospitality suites with a more targeted message a better way to spend their money NEC s recent purchase of Packard Bell will offer the company some real advantages, both with unit production and a broader product line.

When questioned about the absence of IBM Robert Berkowitz, show director for SoftBank the company that runs the Comdex shows claims IBM is simply reconsidering its promotion strategies but that the show is bigger and better than ever. He points out that the number of Comdex fairs worldwide grew from 17 to 40 in the last year and that the Comdex name still draws the brightest and the best and is the pre-eminent name in the world of computer exhibitions He is right, however with the cost and number of shows increasing it isn't surprising that some companies may be pulling back.

Although Digital did not have a booth, Ilene H Lang vice president of its Internet Software Business Unit, presided over the keynote address and tried to sell the crowd on DEC's Alta Vista Web site. The search engine is one of the most powerful and popular indexers on the Net. Her candid remarks to *The Computer Paper* show her to be optimistic about the future of Alta Vista but willing to admit that, like so many others, the Alta Vista company which was spun out of DEC last year has not yet found black ink.



Microsoft and its partners had the biggest booth, where visitors could watch suave young Microsofties offer up well-organized demonstrations of FrontPage97 Windows NT, and most of all Office 97 Symantec, Xerox, Borland Fujitsu and Novell all had good-sized booths.

The Internet is primarily a home-user event and thus the show had a decidedly home/home-office feel to it Claims by some that Comdex is evolving into a consumer show seem to be valid The absence or low profile of wholesale interests such as Intel and Digital seems to support the suggestion. Softbank's business decision to grow the show into a worldwide series of expos tells this reporter that the commercialization of Comdex is well on its way Perhaps it is time

to revamp the format If the PacRim show is any indication, then Comdex Canada '97, in Toronto, July 9-11, and Comdex SCIB '97, in Montreal, Oct. 7 9, may find you rubbing shoulders with your neighbor as often as anyone else.

Wherever the show goes it is safe to say that it will continue to be the biggest gathering of technology buyers and sellers in each region. And it will also continue to be the place where companies come to announce the biggest and the smallest, the fastest and the slimmest, and the lightest and the brightest that the industry has to offer. ❑

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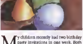
Tools to unlock the artist in all of us

Homemade greetings, creations get professional touch with graphics software

BY JEAN ALLEN-IKESON



My children recently had two birthday party invitations in one week. Both were created on home computers with programs from a group of products called "personal creativity" software. This area is one of the fastest growing and most popular applications for home use

Few of us are artists. A few more have some talent or artistic flare But most of us, like me, sigh heavily over impressive calligraphic invitations or posters for school projects or volunteer organizations. Somewhere, a few developers have figured out that all of us should be able to produce such artwork painlessly Now there is an armload of products waiting to unlock the artist in you.

Most of these programs have templates that let you design projects such as invitations, cards, stationery, labels, certificates, crafts or banners. Some let you do rather sophisticated editing of photos as well You don't have to be a computer geek to use them, nor do you have to spend several days immersed in learning how to use them Usually your first creation is ready to print in 10 to 15 minutes. Just go out and buy extra ink cartridges and fancy paper for your color printer, and start clicking.

These programs are designed to be fun and easy while producing eye-catching results. Forget about blank screens. You are prompted with a choice of projects, then the specific form of the project such as an invitation for kids or adults. You can use preselected text and graphics, or change and add to your heart's content. Some programs, like Corel's Print & Photo House have an enormous library of clipart fonts and photos

In a few minutes I designed and printed return address labels with an orchid graphic (to reflect my hobby) The only thing these programs will not do is let you design and print your own bank cheques—next year maybe. Some of these programs have been morphed into standalone craft centres, mostly for kids, but with enough content for adults to enjoy as well.

Print Paks

Print Paks have a basket of programs, complete with paper or whatever special supplies are necessary for the project. They make a great birthday gift or rainy day project and are priced in big-box discounters at under $30 each Refills of supplies are available from Print Paks They require a system running Windows or Macintosh operating systems.

There are kits for making decorated magnets window art (you print on transparencies), iron-on transfers for t-shirts, calendars and holiday ornaments. These projects are simple enough for a seven-year-old The calendars are suitable for any age and can be customized with special days, holidays, styles and graphics The iron-ons for t-shirts are great for teenagers. By pre-ordering an extra supply of iron-on transfers you could make your child's group sleep-over or slumber party a hit.

My favorite Print Pak is the Create a-Book package which comes complete with cover material, binding, and graphics to customize a story Publishing a story can be great fun at home or at school, and the final product will become one of the treasures that you save from your child's school years. Somehow the idea of writing, which many children see as a chore expands into a creative enterprise

Kids write the story create pictures, and construct the book, cover and binding Step-by-step on-screen instructions make this process simple. Activity (puzzles, etc) book or scrapbook formats are also available. Special characters may be added with picture stamps elements can be resized, and special effects such as stretching a picture should be tried at least once!

Classroom kits for Window Art and Party Fun are available directly from the company

Make your own greeting cards

Microsoft and Micrografx both offer CD-based software that helps you create greeting cards, invitations, announcements, signs, banners, and more. Both are simple to use. It took me about five minutes to create a silly card with a special message for my mother who had just given herself a black eye. I printed it and faxed it within 15 minutes of her phone call. She loved it

These programs can put the spontaneity back into cards, which have become such a commercial and often impersonal exercise The programs come with thousands of pre-designed cards that can be customized and both companies offer updated cards that can be downloaded from their Web pages

The Micrografx American Greetings CreataCard Plus program comes with 50 "greeting card" fonts CreataCard Plus has an optional "lock" for cards or projects that have adult content or text This way your children can use the program without you worrying about giggles or groans coming from the computer area Envelopes may also be printed and an address book and calendar are also included to help you remember special occasions and addresses.

Like Microsoft's Hallmark Connections Greetings Workshop, each screen prompts you with a choice of projects, styles, and features. Messages are pre-written but you can modify them or write a different one if you like the card but not the greeting Even printing is a simple three-step procedure so that even the newest computer users will find it frustration free

CreataCard runs on either Windows 3 1 or Windows 95 and is priced at $39 95 A free edition is available from the Micrografx Web page called Createacard Internet Edition. Microsoft's Greetings Workshop only works with Windows 95 and sells for $35 Of the two programs, which are very similar my personal preference is CreataCard, partly because it offers more cards along with the calendar and address book but also because it seems to be a richer and slightly easier program to use

A print shop in your computer

Corel and Sierra also offer "Print" programs. These are somewhat more complex with

Continued on page **40**

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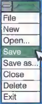

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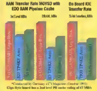

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Tools to unlock the artist

Continued from page **38**

more choices for customization. Sierra's Print Artist 4.0 for example offers 10,000 color graphics 600 photos and 300 typestyles. Rather than greeting cards being the major emphasis, other home and small business "art" jobs are stressed.

For example the programs can be used to create and print a large variety of address, diskette, and shipping labels. You can also print signs for garage sales or volunteer projects like bake sales and car washes Or create your own stationery, business cards, certificates, nametags and more Kids will find the crafts section offers doll houses, airplanes, party hats, and board games

Both Corel's Print and Photo House and Sierra's Print Artist take you a step beyond the two greeting card programs There are more tools for pasting in graphics from large graphic libraries. The preformatted projects are still there, but if you are a little more adventurous, you may find that either will satisfy your hidden artistic leanings Even if your skill level is stuck, like mine, at drawing stick figures, you can turn out "wow!" creations.

Print Artist has matured through several versions, each becoming richer and easier to use. It will run on Windows 3 1 or 95 and sells for an estimated street price of $69 95

How can I say this: I am in love with Corel's new Print and Photo House. Corel already has behind it years of experience producing professional draw and graphics programs such as CorelDraw and PhotoPaint If you write a newsletter, you probably have at least one version of Corel Gallery clipart.

So it should not come as a surprise that a modestly priced program can wheel out such a rich selection of functions and clipart/photo libraries to enhance your project. It is also just about as easy to use as the greeting card programs. An easy "wizard" system walks you through each step so that there is no learning curve (learning curse?) as with some programs But here you can stretch, resize, move add or import features to your heart's content You can also flip rotate scale and change the color of any graphic or text. Or you can draw an original graphic from scratch

The Photo House section has the easiest and most fun selection of photo manipulation tools that I have come across I had a difficult time tearing myself away from the program to sit down and start writing this article because I was having so much fun

First, you can import and scan photos directly into the program These can then be exported to a variety of software—your word processor, desktop publishing program one of the print programs mentioned—or printed If you don t have an appropriate photo, then Corel comes to your rescue with a large library of photos that you can instantly modify in a number of ways Best of all, the simple wizard takes you through the process

In a few minutes, you can turn out professional-looking modifications. For example if you have scanned in an old photo of your kids that has been crumpled, then a feature will "clean up" the photo in a few seconds automatically It will also remove "red eyes." You can also "morph" the photo in a lot of silly ways My favorite is to convert the image to one that looks like it is a color pencil or pastel drawing

I tried this with one of the orchid photos from the Corel library after I had removed the black background and made the picture look a little sharper The results were wonderful. Thanks to Corel I can finally be an artist rather than a klutz.

But even if you are already artistic, you will find Print and Photo House a must-buy for your computer library at $69 95 It runs under Windows 95 or NT

An artist's palette

Perhaps you want a less structured program to free your artistic spirit or your teen is a graphic artist wannabe Fractal Design has established itself with a variety of consumer products that make creating everything from cartoons to fine art pictures a pleasure Its best known product is Dabbler 2, which comes with tutorials by Walter Foster (the same guy who creates those wonderful how-to-draw books) that will teach you how to draw cartoons while following the program.

There are also great online tutorials on how to use the program and its tools These do not convert into weeks of struggle but an hour or two of "playing" with the features while the tutorial shows you what to do next I have tried a number of art or draw programs, but this one has one of the nicest touches

Rather than producing rough and jerky

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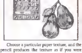
Tools to unlock the artist

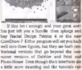
Continued from page **40**

lines, what you see on the screen is pleasing. If your child is moving up from Fine Artist or another children's art program, then they will be charmed with the ease of use and touch. You are offered tools that look and respond on the screen like artist's brushes pencils and pens.



Choose a particular paper texture, and the pencil produces the texture as if you were drawing on textured paper Crayons build up multi-level depth and felt markers bleed. Don't be put off by the cartooning features because the meat of the program will give wonderful results. You can even use Dabbler to manipulate photographs and turn them into paintings chalk drawings or pencil sketches.

What a great weekend project pull out the old photos of your great grandparents clean them up with Dabbler, enlarge them, and then turn them into pencil sketches that can be printed and framed. Or make a chalk drawing of your favorite pet Best of all, Dabbler 2 runs on Windows 3 1/95 or Macintosh from the same hybrid CD and can be found for a street price of $75



If this isn t enough and your great aunt has just left you a bundle then splurge and buy Fractal Design Painter 4 or the new CorelDraw 7 Either program will set you back well into three figures, but they are both professional versions that go beyond the consumer versions of Dabbler and Print and Photo House Even though their interfaces are a little more daunting and the tutorials can stretch over a couple of days, the results, even for amateurs, can be rewarding.

For example, my husband needed a graphic for the cover of a newsletter. The next meeting was a round robin So he scanned a picture of a robin into CorelDraw and then stretched the body of the robin into a circular shape It was a triumph! ❑

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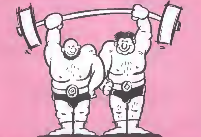

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Supercomputer helps Pacific Northwest survive storms

BY BILL PIETRUCHA

SEATTLE, (NB) — It's nice to have a supercomputer along with an umbrella and galoshes, especially in the Pacific Northwest where severe winter storms devastated the area in late December

The US National Weather Service, the University of Washington and six local state and federal agencies started using a new weatherforecasting supercomputer only weeks before the storms hit providing weather details with an accuracy never before possible and saving lives and property

The detailed forecasts on temperature and winds, "helped us to decide that the snow would turn to rain over central and southern Puget Sound," Brad Colman, scientific officer at the National Weather Service in Seattle, told Newsbytes

The forecasts are emerging from a Sun Microsystems computer on which Clifford Mass, a University of Washington professor of atmospheric sciences, and Mark Albright, a University of Washington research meteorologist, are running a simulation of the region's atmosphere

The computer forecasts many aspects of the complex meteorology of an area stretching from northern California to southern British Columbia Mass said.

The model as well as new systems such as Doppler radar, "are producing rapid and dramatic improvements in our ability to understand the details of local weather and to predict them," says Mass.

Twice a day, data from the US National Weather Service are fed into a computer program that solves a series of complex equations every 12 kilometers (7 5 miles) over the region. The software simulates the evolution of the atmosphere over the Northwest for the next 36 hours detailing such weather patterns as the dry zone to the northeast of the Olympic Mountains, the dispersion of smoke from fires or precipitation from weather features such as a band of clouds and showers called the Puget Sound convergence zone

Mass noted that Sun Microsystems partially donated the Ultra Enterprise 4000 to the group.

According to Mass a computer simulation pictures the atmosphere in terms of a three-dimensional grid with each grid point representing a location where a weather calculation is made.

"The closer the grid points, the more detailed the weather forecast," he said But reducing the distance between the grid points requires increased computer power: Just to halve the distance requires a computer eight times as fast.

"You have to get under 15 kilometers grid spacing (9 3 miles) to even start to get the fine detail of local weather right," Mass said. With the 12-kilometer grid, "we get the major regional weather features, where as before we didn't get them at all "

The forecasts, including weather maps updated throughout the day, are available at http //www atmos washington.edu on the World Wide Web.

Microsoft donates to Vancouver libraries

Microsoft Canada saved some of its splash for the last day of Comdex/PacRim During a media breakfast at a local public library, David Willis a regional manager for Microsoft Canada announced a donation of software products, multimedia Pentiums and technical training and support to Vancouver's public library system. Valued at $675 000, the donation is the company's largest in British Columbia.

Products donated include 16 computers and various software programs such as Office 97, Microsoft Encarta, and a large selection of CD-ROMs for each library The donation is part of Microsoft's Libraries Online program, which plans to contribute $1 5 million in computers services and Microsoft software to Canadian libraries this year. The program is aimed at allowing universal public access to information

The multimedia machines will be wired for Internet access and will undoubtedly use Microsoft Internet Explorer and the Windows operating system Microsoft plans to make donations to more than 250 libraries across North America.—*Rod Lamirand*

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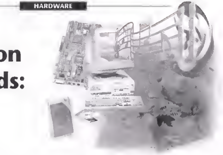

The buzz on sound cards:

A quick peek at what's on the market

BY ROSS MACDONALD

One of the more fortunate traditions in the computer industry has been that, where system prices remain more or less constant, we're certainly getting a lot more for our money these days. And the most visible demonstration of that axiom has been in the area of multimedia. It was only a couple of years ago that a CD-ROM drive, speakers and a sound card were entirely optional, purchased separately and a collectively expensive indulgence. However, thanks largely to the dramatic decline of CD-ROM prices and the economics of using that medium for the distribution of software, the bits and pieces required for computer multimedia have become as standard to a computer system as the keyboard and the mouse.

The codicil to all this good fortune, however, is that system builders often see multimedia components as fertile territory in which to save on the cost of production. Higher-end computer systems will generally incorporate sound cards of respectable ability but it's not unusual to find that they're more than slightly less than state of the art and matched to an equally outdated CD ROM drive and a pair of abominable speakers.

This has led to a great number of multimedia computer owners already wishing to upgrade components in order to gain access to all the great things the expanding world of computer audio now has to offer. Highly sophisticated MIDI software has been available for a long time for example, but was once only for the specialist interested in electronic composition, sound editing or creating professional multimedia presentations. Things like wavetable and new levels in hardware technology, software development and game design, however, have propelled even casual computerists into seeking high

Continued on page **49**

A glossary of terms and technologies for sound card consumers

The following is a primer of the most common terms and technologies that anyone shopping for a sound card is likely to encounter.

Audio codec (A/D/A converter): This translates audio input signals into digital format then returns them to analogue format for output. Works on the same principle as a modem, which MOdulates data into those beeps and whines that the phone lines can carry then DEModulates them back into digital data.

CD audio. This form of audio is the analogue signal that comes off of any CD or CD-ROM—the stuff your living room stereo's CD player plays. Many CD-ROMs contain CD audio as well as other types of sound information, which is why you need to have hookups, drivers and software to reproduce them all.

CD-ROM audio connector: This is how the CD ROM drives audio output gets into your sound card for the production of sound. Internal CD-ROM drives attach to the CD audio connector on your sound card by a special cable. External CD-ROM drives simply plug into the sound card's line-in jack.

CD ROM interface. The way your CD ROM connects to your computer. Usually, it's either IDE or SCSI because the parallel port interface has proven too slow for all that video and animation that makes CD-ROM so much fun.

Digital audio: Sound that's been recorded, translated into digital format, and stored on a diskette or disc (floppy, hard, compact or CD ROM) usually as a WAV file.

Digital signal processor (DSP): A specialized chip on the sound card that's been designed to perform the high-speed, math-intensive functions associated with sound production like real-time special digital effects.

8-bit/16-bit: Without getting into the actual electronic details, an engineer at Creative Labs (maker of the industry standard SoundBlaster sound boards) described the difference between these two specifications roughly as "8-bit gives sound quality sort of like AM radio. 8-bit stereo (and it must be specified as stereo) is like listening to FM stereo radio and 16-bit gives you CD-quality sound and channel separation." It should also be mentioned here that, according to the same engineer, when another manufacturer's card is listed as "SoundBlaster compatible," it means that it will kick back into 8-bit format in most games despite being a 16-bit board. In order to achieve 16-bit SoundBlaster compatibility the card must be specifically listed as "SoundBlaster Pro compatible."

FM synthesis: The traditional method for playing back MIDI (musical instrument digital interface) generated digital audio. It amounts to a digital approximation of the sounds of specific instruments (ie a programmer writes code to tell the FM synthesizer what a piano ought to sound like so that when called upon to sound like a piano it takes that synthetic sample and extrapolates it to cover all the notes MIDI asks for). This has been supplanted in newer and/or more expensive cards by wavetable synthesis (see below).

FM synthesizer: The chip that the sound card uses to generate FM MIDI output (see FM Synthesis above).

General MIDI: Specifies the digital approximations of 128 standard instruments.

Line-in: The jack into which a cable connects your regular audio sources like a tape deck or a CD player.

Line-out: The other jack into which audio is fed back out to your regular audio sources like a tape deck or a stereo amplifier.

Mic-in: Another jack on the sound card into which you plug a microphone. The Mic-in is connected to the Audio Codec. You should expect a gain control with your sound card's controller software to set the input gain to match your microphone's abilities (too much gain makes the input fuzzy just like when your regular tape deck's VU recording meters go into the red zone).

MIDI (musical instrument digital interface): The set of commands that tells an electronic synthesizer how to play the musical sounds. When your sound card reproduces what's stored in a MIDI file, it's simply following a set of instructions.

Multilayering: This is for MIDI enthusiasts. It's when they use more than one sample of an instrument to the same note of a patch (look for "patch" below).

Multitimbral parts. This simply refers to the different instrument sounds a synthesizer can play at once so it can sound like a trio, quartet, quintet, sextet, septet, octet, nonet, etc.

On-board RAM: Higher end sound cards have RAM slots on them just like your computer's motherboard and, in many cases, can use the same type of RAM chips. The sound card uses this RAM as an additional storage area for any wavetable patches you create yourself. If this sounds like something you might like to pursue, try to get a card that comes equipped with at least 512KB or even 1 MB out of the box, and look too at how much additional RAM it will hold. A high-end sound card for the serious user will accommodate 8 MB of RAM or more. Also, avoid any cards that want you to use proprietary RAM when possible because that can be a very expensive proposition.

Patch. Technically speaking a patch is a numbered slot in a wavetable that represents a MIDI instrument. In other words, MIDI files tell the synthesizer to play a

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CD-ROM	6X	4X	N/A	Optional	no	6X	10X	4X	6X / Modem	4X	na / Modem	na	10X	6X	4X	6X
16-bit Audio	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
SKU#	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	797930	580001	580367	580291	587001	752646	752646	[illegible]
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The buzz on sound cards

Continued from page 46

quality sound from their machines

I recently had the opportunity to look at—and listen to—some of the better consumer-level sound cards currently on the market and to investigate just how far things had progressed Virtually all of the cards featured here produced very good sound from a variety of applications and through my high-quality computer speaker system. There was far more variation however, in terms of price, software bundles and in those highly technical specifications that will be of interest primarily to those pursuing recording compositional and other professional audio ends.

Where good sound quality constitutes the greater concern when paying several hundred dollars for a sound card many of the features most roundly touted by each manufacturer for these higher-end products will only be apparent to those primarily interested in MIDI It is in that particular area that the signal-to-noise ratio instrument voice reproduction and other extra technologies are most focused, because it's there that the technical qualities will be most apparent

In short, if playing the occasional CD-ROM or game is where all your audio demands are met chances are the card you have now is just fine—as long as it has wavetable and produces satisfactory sound. In fact, you might look at simply upgrading your speakers to take care of any problems with the latter. If, on the other hand you're looking toward highly sophisticated gaming, MIDI manipulation or the use of voice-type utilities (telephony Internet telephony, multimedia presentations etc) virtually all the cards here deserve some serious consideration for your shopping dollar.

I tried to be as consistent as possible with the listing of technical specifications but was unable to avoid some inconsistencies in what information was obtainable from the manufacturers (who should be contacted if more detail is required)

In alphabetical order by manufacturer the five sound cards I looked at were:

UltraSound Plug & Play (Pro)*

*UltraSound Plug & Play with 512KB RAM on board
From Advanced Gravis Computer Technology Ltd
Estimated street price $200 (standard)/$275 (pro)

Technical specs.

Sound quality and general features: AMD Interwave DOSP digital effects processor (RAM required) 512KB RAM on board (Pro version only) 32 voice wavetable synthesizer 32 digital effects channels with hardware mixing CD-quality recording and playback at 16-bit 48 kHz 20 Hz 20 kHz frequency response <0 1% total harmonic distortion full duplex simultaneous transmit and receive no built in amplifier

Compatibility: UltraSound SoundBlaster AdLib Roland MT 32 SCC 1

Expandability: Up to 8 MB RAM using standard 30-pin <70ns 1 MB or 4 MB SIMMs.

Input-output: Line-in line-out microphone-in, ATAPI EIDE CD ROM interface 2 CD audio connectors

Game/MIDI port: Joystick connector (with automatic speed compensator for older games) MIDI adapter connector

System requirements: 386 or greater PC (25 MHz minimum recommended) DOS 5 (DOS 6 or greater recommended) Windows 3 1 (running in Enhanced Mode) or greater for Windows applications

Upgrade options: Joystick Y cable universal MIDI adapter

Bundled software: Adobe Acrobat (to read the online manuals) WinDecks (stereo-rack type mixer and controller) Cakewalk Express (MIDI sequencer for Windows) Sound Forge (sound editor) Power Chords Debut (guitar-based sequencer) I-Phone (Internet phone utility)

Warranty: Three years against defective materials and workmanship (shipping not included)

Based right here in Canada Advanced Gravis is a well-known and well-respected manufacturer of specialized add-ons in the area of joysticks, game pads MIDI adapters, and, of course, sound cards And it should be pointed out that the biggest obstacle to a larger market share for their past sound cards has been a lack of SoundBlaster compatibility That's no longer the case however, and Advanced Gravis is now gaining more well deserved recognition in the sound card market since including SoundBlaster emulation, albeit in software rather than hardware

Gravis sound cards have always been considered rather toward the high end of the mid range in consumer-oriented sound cards due to both their quality and their ability, and despite those past incompatibilities for DOS-based game players.

The UltraSound Plug & Play Pro currently stands as Gravis top-of the-line sound card (differing only from the non Pro version in having 512KB RAM on board) due to its impressive features and very impressive output for standard consumer use—games, CD-ROMs, music CDs, etc It also has some considerable practicality for those who require the more specialized and sophisticated MIDI composition, recording, and playback type of ➤

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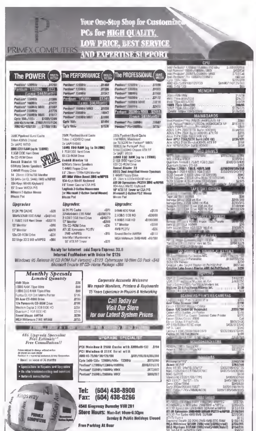

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abilities but only at a beginner to intermediate level. Professional MIDI musicians/composers will be looking elsewhere for a more full featured hardware/software combination.

Well placed within the home and SOHO/consumer market, the physical installation of the card is appropriately straightforward, though actually getting it to work required an inappropriately more professional level of computer acumen. The main reason for this is that virtually all the documentation for the utilities, the bundled software, and the card itself is on a single CD ROM, accompanied only by a five-page booklet to essentially get that CD ROM running. The drivers for the card are on a separate pair of floppies.

A hint of the complexities ahead comes when you first turn on your computer after installing the card because, though "Plug and Play" (PnP) implies that the card will be immediately recognized on boot up, that turns out to be only half true.

Installed under Windows 95 on my test machine, the UltraSound Plug & Play was, in fact, recognized as new hardware but was not specifically identified until the "install new hardware" routine was run using the card's driver disks. More mysteriously, the obligatory (and expected) restart of the system after driver installation requires that the install routine be run no less than three times in order for your machine to finally produce all the sounds your applications have been promising.

A quick visit to the device manager after all that's done shows three drivers for the UltraSound Plug & Play, two for AdLib Emulation and one for MPU-401 Emulation. SoundBlaster emulation is installed separately through a file called IWSBOS but run from the GUS prompt and this file must, unfortunately, be executed before running the sound setup for each individual DOS-based game. On the more fortunate side, however, it only has to be done once for each game. But still, you have to dig through the booklet and online documentation to even learn that.

A quick call to Gravis revealed that this rather convoluted process of installation was a recognized problem with the first version of the drivers (which is what I received), but that the UltraSound Plug & Play cards shipping by the time you read this will be packed with a new, updated and "streamlined" driver that installs everything properly in a single pass and contains an efficient uninstall as well.

Once full and proper installation of my version was finally accomplished, however, the UltraSound Plug & Play Pro produced a rich, hi-fidelity sound from virtually all the applications we tested, from various Windows 95 sound schemes through games, CD-ROMs and audio CDs.

Running a number of MIDI files from various sources, however, demonstrated that the UltraSound Plug & Play is certainly capable but certainly not for the serious MIDI music maker. The instrument voices were clear and noise free and would likely have been considered very good had I not had all these other sound cards with which to compare. The Gravis MIDI sound is certainly not bad, but is easily equalled by all and surpassed by many of the other sound cards. An in-store demonstration will be the best way to determine whether this card will meet your MIDI requirements.

The WinDecks audio device controller was

Continued on page 52

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The buzz on sound cards

Continued from page ***50***

most appealing with its graphical representations of a master control along with controllers for an amplifier plus General MIDI, Digital Audio and CD players. Avid gamers will also appreciate the joystick port, which automatically adjusts reaction speeds to compensate for the discrepancy between older games and the newer, faster computers. Gravis is the only company I'm aware of at this point to take this into consideration.

Definitely designed with the serious gamer and slightly more than casual consumer in mind the Gravis UltraSound Plug & Play Pro is likely to be very popular as it's at those levels that most computer audio needs are met.

SoundBlaster AWE32 PnP

From: Creative Labs Inc.
Estimated Street Price: $348

Technical specs:

Sound quality and general features: PnP compliant, 512KB RAM on board built-in 4 Watts/channel at 4 ohms stereo amplifier 1 MB MIDI ROM, WavEffects DOSP digital effects processor 32-voice EMU8000 wavetable synthesizer 32 digital effects channels with hardware mixing CD-quality recording and playback in 8-bit and 16-bit format 5 Hz to 44.1 kHz frequency response <0.1% total harmonic distortion full duplex simultaneous transmit and receive (for Internet telephony) E-MU 3D positional audio capability (for supported applications) Creative 3D stereo enhancement (for 3D effects from two speakers)

Compatibility: SoundBlaster 16 AdLib OPL3 an OPL2

Expandability: Up to 28 MB of standard 30-pin RAM SIMMs Wave Blaster II daughterboard (upgrades to 64 voices and 2 MB of sampled sounds)

Input-output: Line-in, line-out, microphone-in speake out, ATAPI EIDE CD-ROM interface 2 CD audio connectors.

Game/MIDI port: Joystick connector MIDI adapte connector

System requirements: 386 or greater PC DOS 5 an Windows 3.1 (running in enhanced mode) or greater 4 MB RAM (8 MB recommended)

Upgrade options: Advanced signal processor chip fo hardware compression and decompression of audi data

Bundled software Creative Multimedia Deck (stereo-rack type mixer and controller), Creative WaveStudi (WAV editing program) Creative Soundo'le (digita effects editor) Creative TextAssist (text-to-speech software) Vienna SoundFont Studio (sound editor) MIDI Orchestrator Plus (MIDI recorder editor and notator) Creative WebPhone (full duplex Internet phone utility)

Warranty: One year against defective materials and workmanship (shipping not included)

Creative Labs SoundBlaster is to computer sound what Intel, Hayes, and Microsoft have become within their respective fields of manufacture—the popular standard by which all competitors are compared in terms of compatibility ability or both. And the AWE32 PnP furthers that tradition for Creative Labs in offering very advanced features at a relatively reasonable price. As the specs demonstrate, this card offers a great deal out of the box and even more in potential when th expansion options are undertaken.

Off the top however it should by mentioned that this card is a full 34.3 cm (13. in.) long so it will require a free slot on you motherboard that has virtually no obstructions behind it, right to the back of you machine (i.e., no chips or other protrusion clear across the board).

As might be anticipated, installation wa simple and straightforward under Window 95 thanks to the PnP feature that identified the new card immediately to the machine. Drivers slid nicely into place off the Window 95 installation floppy diskette provided and a quick test demonstrated that all was well afte less than 15 minutes between opening th box and making noise.

An 84-page, easy-to-follow manual is provided to guide you through the process (a well as tell you all kinds of technical detail about what the card can and can't do) an you'll also find a very handy 24-page bookle of PnP installation tips for anyone with a non PnP compliant computer system or tho wishing to install the card under DOS o Windows 3.x using the PnP configuratio manager disk you'll also find in the box.

Bundled software and utilities are provid ed on a single CD-ROM from which you ca install those of interest in an equally straight forward manner. As with most quality card these days a graphical representation of stereo rack is offered as a general controlle except that with Creative Multimedia Deck which is the name of the incarnation we ge here, there's the addition of a virtual remot control for taking care of the major function (track, forward reverse, pause, etc.). Furthe to the software Creative Labs nicely include an uninstall that completely cleans out al traces of the drivers, etc. should that becom necessary due to unlikely configuration prob lems or future alterations.

Continued on page 5

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The Computer Paper Feb '97 p 76

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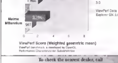

ViewPerf benchmark is developed by OpenGL Performance Characterization Subcommittee

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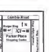

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The buzz on sound cards

*Continued from page **52***

Hardware-wise, there are a few bonuses to be found in the box by way of a standard RCA stereo patch cord for attaching external devices, a microphone, and even a generously proportioned MIDI cable to help budding composers and recording engineers get started.

But what really counts with a sound card is, of course, sound, and the AWE32 PnP produced the crisp, clean, hi-fi sound through all the applications with which it was tested. The CD audio was particularly pleasing, and those with unamplified speakers will be glad of the built-in amplifier, which happily boosts the audio signal to more than audible levels. The 3D enhancement is also a happy feature despite the fact that I've never managed to hear anything that even approaches the surround sound effect promised by the various technologies that attempt it. On the other hand, once the enhancement is employed, there seems to be no point in ever switching it off as it most certainly adds extra dimension to what comes out of two speakers

Designed for the serious gamer, potential music maker, and discriminating consumer, the AWE32 PnP is a serious sound card with sophisticated abilities but well within the reach of even the modest computerist who anticipates future expansion of audio interests.

Audio 16*

* Sold as component of full multimedia kit

From Diamond Multimedia

Estimated street price: $499 (for full multimedia kit)

Technical specs:

Sound quality and general features: 128 instrument general MIDI, ADMOS QS-1000 32-voice wavetable synthesizer 20-voice OPTI-931 FM synthesizer, 512KB MIDI ROM. CD-quality recording and playback, <0.1 percent total harmonic distortion, frequency response to 48 kHz, 3D enhanced audio effects.

Compatibility: SoundBlaster ADPCM, Roland MPU-401

Expandability: n/a

Input-output: Line-in, line-out, microphone-in, speaker out, audio CD connector, ATAPI EIDE CD-ROM interface, internal auxiliary line-in, internal telephone headset

Game/MIDI port: Joystick connector, MIDI adapter connector

System requirements: 486 or greater PC, Windows 3.x or Windows 95

Upgrade options. n/a

Bundled software: Diamond Audio applications (utilities for sound recording, editing and playback), Virtual Fighter PC, Comix Zone, Ecco the Dolphin, Tomcat Alley, Myst, Magic Carpet, Alphabet Blocks, CorelDRAW 4.0, Compton's Interactive Encyclopedia.

Warranty: One year against defective materials and workmanship (shipping not included)

Diamond introduced complete multimedia upgrade kits several years ago with such success that they're now selling their multimedia components exclusively in that manner. The Diamond Audio 16, then, is part of the larger Diamond 12x Multimedia Kit, which includes a 12x Mitsumi CD-ROM drive and a pair of Labtec LCS-1012 amplified speakers along with the sound card itself. This means that those shopping for sound only will not be able to get an Audio 16 alone. However, since many who are looking for a sound card upgrade are unlikely to have a 12x CD-ROM drive in their system, it's worthwhile considering the whole kit since it sells for little more than what the other sound cards in our review sell for alone

That very attractive selling price for the whole kit is only partially reflected in the somewhat limited features of the Audio 16—though it should be emphasized that the Audio 16 is a full 16-bit sound card with 32-voice wavetable audio and 3D sound enhancement. This makes the 12x Multimedia Kit an appealing upgrade for those still without wavetable capacity on their sound card and with an older CD-ROM drive but not, perhaps, suitable to anyone looking for serious audio and MIDI manipulation ability

That's because, as the technical specs delineate above, the limitations of the Audio 16 lie primarily in the fact that it's not expandable or enhanceable. The specifications are actually quite respectable but they define exactly what the card does now and always will do in the future

All the Audio 16 drivers and its simplified audio utilities are supplied on two 3.5-inch floppies, while that impressive bundle of games and applications is provided on a separate stack of CD-ROMs. Installation under Windows 95 is, of course, very easy and the utilities include the now universal stereo-rack type controller for CD player, MIDI player, WAV player, and mixer.

Instructions for all components in the 12x Kit are provided in a quick installation guide and a more comprehensive booklet augmented by online help once everything is

*Continued on page **56***

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The buzz on sound cards

Continued from page 54

installed I found all of the component-specific documentation to be efficient at getting me going but sorely lacking in the kind of technical detail that serious audio and/or multimedia aficionados might require for those highly technical or customized configurations. In fact, I was only able to get what details I have on the technical specifications by calling Diamond directly

In short, the Audio 16 sits rather toward the middle of the mid-range of sound cards while producing very good sound for games and standard applications. It may, however, prove too limited for the MIDI and multimedia experimenter because MIDI capture and playback just isn't up to the standards established by some of the other cards in this survey—as clearly indicated by its restriction to 512KB of built-in MIDI ROM. In its favor, though, stands the fact that this card comes complete with many of the features found on more sophisticated cards and is bundled with all those other goodies for less than a couple of hundred dollars more than the other cards in our survey cost.

AudioTrix Pro

From: Mediatrix Peripherals Inc.

Estimated street price: $265 (optional daughterboards $150+ each)

Technical specs:

Sound quality and general features: Yamaha OPL4 wavetable/FM synthesizer 128-instrument general MIDI 24-voice wavetable synthesis, 20-voice FM synthesis, 2 MB MIDI ROM digital audio tape (DAT) quality recording and playback, built-in 4 Watts/channel at 4 ohms amplifier <0 1 percent total harmonic distortion 0-22 kHz frequency response (at 48 kHz playback rate).

Compatibility: AdLib OPL2 and OPL3, SoundBlaster, Windows sound system Roland MPU-401

Expandability: Proprietary 512KB RAM daughterboard.

Input-output: Line-in line-out, microphone-in IDE CD ROM interface, audio CD connector.

Game/MIDI port: Joystick connector MIDI adapter connector.

System requirements: IBM XT, AT or compatible PC (386 or greater recommended), DOS 3.1 or greater, Windows 3 1 or greater for Windows applications.

Upgrade options: DVC/Phone daughterboard (for full duplex transmit and receive), DDSP/Effects Processor daughterboard (with SRS 3D sound), DDSP/Voice Processor daughterboard (with SRS 3D sound) multiple CD-ROM interface daughterboard (supports Panasonic, Mitsumi and Sony 2x CD ROM drives and TEAC 4x CD ROM drive)

Bundled software: Audio Works Recording Session (combined rack-mount stereo type controller MIDI sequencer WAV editor) JukeBox for DOS and Windows (audio file player) MOD4WIN (module file player) DMP (DOS based module file player) SuperJAM! Jr (music creation progam), Soft Karaoke (just what it sounds like)

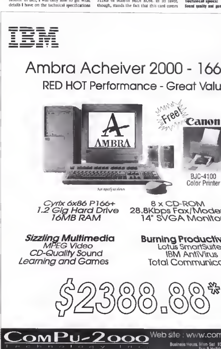
Warranty: One year against defective materials and workmanship (shipping not included)

Another proudly Canadian product, the AudioTrix Pro has been around for about three years now but was so far ahead of the competition in terms of ability and flexibility when introduced that it remains a current as well as very desirable product You should be aware however, that this card's genuine sophistication does not come without some sacrifice in terms of purchase price, ease of use, or even installation

The AudioTrix Pro ships with a reasonable pair of unamplified Aztec CS-55 computer speakers as an added bonus. Separate Windows 95 Windows 3 1x DOS and Windows NT 3 51 and NT 4 0 drivers are provided on floppy diskettes as is the software bundle—making for a total of 12 floppies out of the box instead of the usual one or two plus CD ROM Installation, thanks to the new Windows 95 drivers, is relatively straightforward and the card, of course, works very well for standard applications as a standalone product thanks to the broad compatibility of the card and thanks to that 2 MB of built-in MIDI ROM

And it's in the area of MIDI files that the difference in this card really shines through Where the other cards I listened to were all generally very, very good the AudioTrix Pro is nothing short of excellent in terms of the fullness of its MIDI sound Any serious MIDI fancier should make absolutely sure to examine this card before making a commitment to purchase any other.

Another characteristic separating the AudioTrix Pro from its rivals is the expensive yet impressive flexibility facilitated by the range of optional daughterboards, all of which snap onto the card in a matter of seconds. I received the DDSP/Voice Processor board, which allows for the processing of input from the microphone and the CD audio, and adding effects independently to input from each Mediatrix tells me this is its best selling add-on module though most of the others look equally inviting, particularly the DVC/Phone daughterboard for full duplex Internet phoning It should be pointed out, however, that those wishing to use the



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AudioTrix Pro with multiple daughterboards will have to open up their machines and physically exchange them every time they want to use a particular module. The card can't accommodate multiple add-on daughterboards.

A warning, too, that this is the only card in this survey that employs proprietary RAM expansion at the unbelievably exorbitant price of $150+ for 512KB. Also, 512KB is currently the only amount of RAM available but that's well compensated for by the 2 MB of MIDI ROM that comes standard with the card.

As the titular suffix indicates, the AudioTrix Pro reaches somewhat beyond the scope of the average consumer's needs in terms of its technical specifications and ability—the designation "Pro" as applied here constitutes much more than a marketing ploy. But, by selling as a standalone card for a relatively reasonable price while facilitating upping the ante at any time, this sound card will likely stay with its owner long after a few computer systems have been traded in.

Tropez Plus
From Turtle Beach Systems
Estimated street price: $299
Technical specs:

Sound quality and general features: ICS WaveFront wavetable synthesizer, Yamaha OP3 FM synthesizer, 128-instrument general MIDI, 32-voice wavetable synthesis, 20-voice FM synthesis, 4 MB MIDI ROM, CD-quality recording and playback, <0.1 percent total harmonic distortion, 20-22 kHz frequency response, selectable 4 kHz to 48 kHz sampling rate, full duplex transmit and receive for Internet telephony

Compatibility: SoundBlaster, SoundBlaster Pro, Roland MPU-401

Expandability: Up to 12 MB RAM using standard 30-pin RAM SIMMs

Input-output: Line-in, aux-in, line-out, microphone in, ATAPI EIDE CD-ROM connector, audio CD connector, external MIDI connector

Game/MIDI port: Joystick connector, MIDI adapter connector

System requirements: 386SX or greater PC, DOS 3.1, Windows 3.1 or greater for Windows applications

Upgrade options: Cable to accommodate up to two MPU 401 compatible external interfaces.

Bundled software: Wave SE utilities (recording, playback, editing etc.), DOS utilities: Strates (MIDI sequencer), Sierra Audio Rack (stereo-rack type controller), MicroWave (recording and DLE utility), WaveFront Control Panel (MIDI synthesizer controller), SampleStore (general MIDI instrument editor), MousePlayer (MIDI preview software for those without external MIDI synthesizer).

Warranty: One year against defective materials and workmanship (shipping not included)

Turtle Beach is well known as the purveyor of very high-end audio boards for the serious sound buff. Fortunately for the rest of us, they also make a few mid-range cards for the not-so-serious but still sophisticated computer audio pursuer. And it's toward the upper end of that niche that the Tropez Plus comfortably sits.

With specs and abilities that match or better most of the other mid-range cards here, the Tropez Plus produces excellent overall sound and, as indicated by the 4 MB of MIDI ROM provided, equally satisfying and sophisticated MIDI. As with all the other cards I looked at, installation and configuration through Windows 95 was problem free and there's lots of help and information in the 140-page manual for those installing under Windows 3.x or DOS.

Separate drivers for DOS/Windows and Windows 95 as well as the software applications are provided on five floppy diskettes and, as with all the other bundles, appear to be differentiated more as a matter of taste than efficiency when it comes to the interfaces employed. MousePlayer in particular, however, was a handy little item that allowed me to play a graphically represented keyboard to produce MIDI sounds without an actual electronic keyboard—simply point and click.

The Tropez Plus is an excellent choice for just about anyone looking for extremely high-quality components but, on the other hand, it has many abilities well in excess of what would likely be utilized by the average consumer. For intermediate MIDI enthusiasts not yet ready to join the pros the Tropez Plus will most definitely be among the finalists for purchase. ❑

Contact:

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glossary

Continued from page 46

particular instrument by specifying its patch number.

Patch librarian: Quite simply, a program for organizing all the patches into banks either for storage on a disk or for loading into your sound card's wavetable memory (onboard RAM above).

Polyphony: This tells us the number of instruments a synthesizer can play at the same time. If you see something like "eight-voice polyphony" specified for a sound card that you're considering, it means the synthesizer on the card can play an eight-note chord.

Sample: As you might guess this is a digital recording of an instrument playing a single patch.

Sample editor: A program that fine tunes the samples and assembles them into a continuous stream of sound.

Shared MIDI/joystick port. The largish output jack found on most sound cards that lets you alternately plug in your joystick or a MIDI instrument. Some ports are configurable for two joysticks for gaming.

Speakers-out: A jack on some sound cards into which you can plug unpowered speakers.

Stereo amplifier: This is contained on some sound cards so that you get a signal boost to that speakers-out jack. It's usually capable of only a few Watts of power so don't expect ear-splitting volume from your speakers though it might do more than damage you through a headset so be careful.

Wavetable: A collection of sounds taken from real instruments that have been stored in a set of chips. Remember FM Synthesis? ... electronic approximations of instrumental sounds? Wavetable is far superior in reproducing the real sounds of the instruments because real instruments are sampled. For the piano, for example, a real piano note is played, encoded and stored in the wavetable's ROM (see below). When your audio requirements call for a piano, that sample is used to create all the notes you're calling for so it sounds much more like a real piano than the old FM synthesizer. Wavetable used to be found only on high-end cards but it's rapidly becoming a standard. Pay the little bit extra and get a card that has wavetable for sure.

Wavetable ROM: The ROM chips on the sound card where the factory-installed wavetable samples are stored for play back by the wavetable synthesizer.

Wavetable synthesizer: The part of the card that makes use of the wavetable samples stored in wavetable ROM and in the on board RAM to produce the General MIDI output. (You should be able to understand what all that means at this point.)

So there you have it. Whenever you read a sound card review, or a box, or listen to a sales pitch for a sound card or multimedia equipped computer, you'll not only know what the terminology means, but what questions to ask as well.

We stumbled onto a great freebie on the Internet from Yamaha electronics that actually makes cheap sound cards sound "really great." The address is: http://www.yoba.com and the downloadable patch is called MIDPLUG.

MIDPLUG functions as an alternate sound driver that gives all your programs stereo wavetable audio and reverb. The resulting overall sound has that unique Yamaha quality that anyone familiar with the company's synthesizers will already be able to relate to. The free MIDPLUG download expires in June. —*Ross MacDonald*

KOMO TV starts HDTV

BY BILL PIETRUCHA

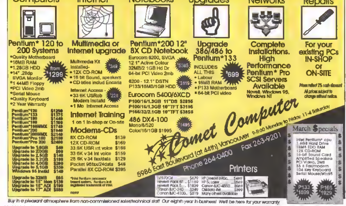
SEATTLE (NB)—Seattle's Channel 4, KOMO TV (which many BC residents watch via cable) became the first commercial broadcast station on the West Coast of the United States to transmit digital high-definition television (HDTV). The ABC affiliate, owned by Fisher Broadcasting Inc., began to first digital HDTV broadcast in mid-January under an experimental licence granted by the U.S. Federal Communications Commission (FCC). The landmark broadcast makes KOMO TV-HD only the third station in the U.S. to launch digital HDTV transmission.

The station also holds a number of other West Coast television firsts, including the first in the Northwest to broadcast live in color in 1954 and the first to provide television stereo sound in 1984.

KOMO's HDTV transmission uses a digital television transmitter provided by Larcan Inc. and antenna technology from Dielectric Communications, according to the station's senior vice-president and general manager, Dick Warsinske. The digital modulation, demodulation, and decoding equipment was developed and provided by Zenith Electronics Corporation. Warsinske said that advancements in high-definition technology will replace today's current analog standard, "making it the first fundamental change in television in over 50 years."

"Digital HDTV is as close to reality as I have ever seen," Warsinske said. "The crystal clear pictures and surround sound stereo audio will take our viewing experience to an extraordinary new level."

The KOMO TV-HD broadcast comes less than a month after the FCC adopted the digital television broadcast standard developed by Zenith and other members of the Digital HDTV Grand Alliance. January's test transmission of high-definition television was the first step, Warsinske said. ❑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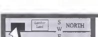

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Modem speakerphones turn your PC into an answering service

BY
DAVID CHAO

How much time do you spend on a phone each day? I must spend anywhere from two to four hours a day chasing after my contacts, collecting information from sources and checking for messages. And, because my hands are tied up during the conversation. It's awkward to take down notes and look up information while talking to someone. What's more, the whole concept of "leave-me-a short message-and-I'll-get-back-to-you" somehow doesn't work well when we're constantly playing phone tag.

Is there a solution? Perhaps, and you just might find it bundled with your next modem purchase. Welcome to the world of telephony.

As modem prices continue to drop and the market becomes increasingly competitive, modem manufacturers are now looking for ways to provide better value to their customers. As a result, more and more modem makers are integrating a professional full-duplex speakerphone and multiple voicemail capabilities into their mainstream faxmodem units.

The telephony systems may help you get your phone life in order by freeing up your hands during a call (you can now write notes!) providing user-specific voicemail boxes (you no longer have to take phone messages for someone else), and giving you such extra features as pager message notification, fax-on-demand, caller ID support, and distinctive ring.

This concept isn't new, of course, but for the first time in years, these high-quality telephony modems have become affordable. In fact, in many cases, the full-blown telephony modems cost only $40 to $80 more than the average modems that don't offer voicemail and speakerphones. The modems tested in this review ranged in price from $200 to $240 (estimated street prices).

Another important point to remember is that the new generation of telephony modems offers distinct advantages over conventional, handset type telephones equipped with a built-in speakerphone and answering machine. For starters, the modem speakerphone provides clean, amplified sound through your sound card and PC speakers (which means you can also adjust the volume, bass and treble to increase the quality of sound). This is a far cry from the mediocre sound you get from headset-type speakerphones.

Unlike regular answering machines, you don't have to worry about the machine "cutting the messages short" when using the modem's voicemail system. In fact, your friends can talk as long as they want, allowing them to spell out all the details for you (this could prevent "now it's your turn" phone tag). With modems offering anywhere from nine to an unlimited number of voicemail boxes, you can set up separate boxes for yourself, your spouse, your roommate, your colleague, or whoever. In effect, the voicemail systems in modems act just like those found in the corporate world, except for the fact that you've only paid a fraction of what they paid.

And yes, you can say goodbye to annoying cassette tapes and muffled messages. The telephony modems' state-of-the-art digital systems give crisp, clear messages, no matter how many times you replay them. No moving parts means no wear and tear.

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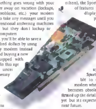
message has been received—try finding that capability in a regular phone!

Of course, like all things in life, there are some disadvantages in using a telephony modem over a conventional speakerphone For one, you have to keep your computer running all the time if you want it to receive messages and act as a virtual answering machine

And if something goes wrong with your PC while you're away on vacation (lockups, crashes GPF problems, etc.) your modem won't be able to take any messages until you get back. Conventional answering machines may be crude but they don't lockup or freeze up like computers

In any case, you'll be able to save a couple of hundred dollars by using your telephony modem instead of going out and buying a new telephone equipped with these features. In this age of economic uncertainty, every penny counts.



For this review I evaluated three popular telephony modems Cardinal MVPV34XSP (external) US Robotics Sportster Voice 33.6 with Personal Voice Mail (internal) and Diamond SupraExpress 336i Sp modem (internal)

Because our focus is on the telephony features I've concentrated my efforts on evaluating these specific functions In most cases the capabilities and features are similar across the three modems There are, however enough differences among the models to provide a slightly different real-world experience Here's the rundown

US Robotics Sportster

As expected from a top-notch brand the US Robotics Sportster Voice 33.6 performed flawlessly Although it has only nine voice mail boxes (compared to 1,000 or more in others), the Sportster boasts a whole array of features fax-on-demand caller ID display, distinctive ring support, Plug and Play, and alphanumeric pager notification, to name some More importantly, US Robotics provides a "56Kbps upgradable offer" for the Sportster, which makes it possible to extend the life of the modem when 33.6Kbps modem speed becomes obsolete US Robotics has not firmed up the details for the upgrade program yet but it's expected to be announced in the near future.

(Cardinal is not offering an upgradable program, only "up-tradable"—trade-in your old unit and pay extra for the new 56Kbps model Supra has yet to decide how to handle the 56Kbps issue but the spokesperson I talked to said Supra will likely opt for the trade-in policy as well)

Setting up the Sportster was simple quick and hassle free Upon installation of the internal unit (into one of the expansion slots), my Windows 95-equipped ➤

	Cardinal MVPV34XSP	US Robotics Sportster	SupraExpress 336i Sp
Estimated street price	$240	$220	$200
Type tested	External	Internal	Internal
Communication software (fax, voice)	FaxTalk Messenger	Smith Micro QuickLink*	FaxTalk Messenger
Modem speed	33.6Kbps	33.6Kbps	33.6Kbps
Fax transmission speed	14,400	14,400	14,400
Plug and Play	Yes	Yes	Yes
Supports Win 3.1/95	Yes/Yes	Yes/Yes	Yes/Yes
No. of voicemail boxes	unlimited	9	unlimited
Remote message retrieval	Yes	Yes	Yes
Pager notification of messages	Yes	Yes	Yes
Supports:			
Canadian-style caller ID	No	Yes	No
Distinctive ring	Yes	Yes	No
V.80 video standard	No	No	Yes
Full duplex speakerphone	Yes	Yes	Yes
Automatic distinction between fax and voice	Yes	Yes	Yes
Fax-on-demand	Yes	Yes	Yes
Simultaneous voice and data	Rockwell AudioSpan & Radish VoiceView	No	Rockwell AudioSpan
Upgradable/up-tradable to 56Kbps unit	Up-tradable	Upgradable	Not announced
Cost of upgrade	Not announced	Not announced	Not announced
Microphone included	Yes	Yes	Yes
Audio cable for sound card connection included	Yes	No	Yes
Other software included	Televox Internet Telephony Anyware Anti-Virus, InterGO Browser, AOL, Compuserve	Spyrnet Mosaic browser, VocalTec Internet Phone, Intuit Quicken, SurfWatch Iris Antivirus, United Connections, AOL, Compuserve	COMit VDO Phone, VDO Live, Microsoft Explorer, Farsite Lite, Warcraft II AOL, Compuserve
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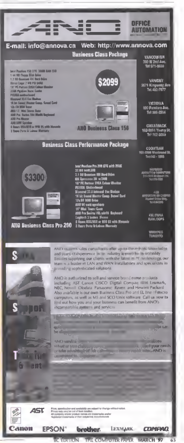

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AST Canon EPSON brother. LEXMARK COMPAQ

PC immediately recognized the modem and automatically configured the IRQs and the COMport (what a relief) No more fumbling with jumpers

(Editor's note *We also tried to install this "Plug and Play" modem into one of our systems but although the unit is recognized it would not work until we first deleted Com2 from the system setting in the Windows 95 control panel*)

The Sportster comes packaged with Smith Micro's Quicklink Message Centre which includes a data/fax communication tool, call manager, mailbox manager, and, of course, the speakerphone itself The call manager, in particular, is well executed. Its intuitive design made it possible for me to start using the voicemail and speakerphone immediately without actually referring to the manual

It is also important to note that of the three only the US Robotics software supports the Canadian-style caller ID (which differs from the type used in the United States) It therefore correctly displayed the caller's number when the phone rang. With the other two modems the numbers came out jumbled, because their communication software does not support the Canadian style caller ID

Using voicemail is easy whether you're at home or out Retrieving messages from outside simply requires you to press 1 (for new) or 2 (for old) You can set your answering system to accept messages up to 999 seconds in length (that's 17 minutes)

About the only thing it could not do was provide music while on hold The Sportster, by the way, can automatically distinguish between fax and voice calls, allowing you to use one phone line (other modems offer the same feature)

The Sportster's "Connections" CD ROM came bundled with a wealth of software, including the Sprynet Mosaic Internet browser, Vocaltec Internet Phone, Intuit Quicken, Iris Anti Virus, and more As with others, the CD ROM also included a free trial subscription to popular online services such as Compuserve and America Online

The Sportster came with its own microphone which can be plugged into the back of the modem The only issue here is that you end up with two microphones (one for the modem speakerphone one for general PC use through the sound card), unfortunately there is no way of getting around it Both Cardinal and Supra suffer from the same problem.

You don't need to have two sets of speakers, though, if you plug an audio cable between the modem's speaker output and the sound card's line-in jack. The sound from the speakerphone will then be heard through the PC speakers.

For some reason, the US Robotics manual failed to point this out and the package did not contain the necessary audio cable for doing this. Not to worry however since you can buy the stereo mini-jack audio cable from an electronics retailer like Radio Shack

The Cardinal and Supra modems both came with the cable and an explanation of how to connect it to the sound card.

But aside from these minor complaints, the US Robotics Sportster stood out as the simplest—if not the most sophisticated—unit to operate and use Add to this its Canadian-supported caller ID loads of bundled software and the highest speakerphone sound quality, and you have one of the best values in its class.

By the way, as I was putting the finishing touches on this article, US Robotics informed me that the Sportster modems are now being shipped with the newest version of the Smith Micro software RapidComm. Based on my brief preview of this version, it looks like the interface has been vastly improved

Diamond SupraExpress 336i Sp

The Sportster may win on its simplicity and ease of use, but the Supra Express model has the upper hand on features and level of sophistication. Unlike the US Robotics unit, the SupraExpress boasts an unlimited number of voicemail boxes (limited only by your hard drive), Rockwell's AudioSpan simultaneous voice and data capability and support for the new V.80 video standard—the only model out of the three to offer this new video support.

Although you still need a video capture card and digital video camera, the V.80 support gives you the ability to perform video conferencing through a specific software. Because the V.80 application interface directly supports the new H.324 standard adopted recently (for video phone technology over ordinary telephone lines), the Supra modems are essentially "video-phone ready" This sounds a bit confusing at the moment, but we'll cover this area in more detail in the future.

Continued on page 66

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NETWORKING
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Continued from page 64

The Supra's SVD (simultaneous voice and data) may not affect how you use your speakerphone or voicemail, but it has significant implications for those who play games or would like to utilize application sharing methods. I won't get into details in this review, but in a nutshell, SVD lets you "talk and transmit/receive data" at the same time over a single telephone line. This means you can talk to your opponent while playing a modem-to-modem game, as well as view documents and edit them while talking online with your colleagues.

Supra bundles Blizzard's Warcraft II game and a trial version of Databeam's FarSite document-sharing software to allow you to try SVD firsthand.

As far as the speakerphone and voicemail are concerned, the basic features are similar to the US Robotics unit. The FaxTalk Messenger software that came with the unit, though, does boast more flexibility and sophistication, such as unlimited phone book entries (eight speed dials plus accessible phone book), unlimited voicemail boxes, music-on hold and password-protected remote retrieval.

As well, the FaxTalk software has a more attractive design with a large easy-to-read display and pleasant "pop-up" screen that appears when a call comes in. It's unfortunate that both the Supra and Cardinal do not support Canadian-style caller ID output.

While I prefer the FaxTalk software over the Quicklink, Supra's speakerphone sound quality trailed behind that of the US Robotics Sportster. I had to constantly adjust the location of my amplified speakers and play around with the microphone sensitivity to reduce the feedback noise that came through the speakers. The problem becomes more pronounced when you use higher power amplified speakers.

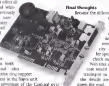
With a low price (estimated street price of $200) and extra features not found in others, the Supra gets my nod for giving you the most bang for your hard-earned buck.

Cardinal MVPV34XSP

For the Cardinal unit, an external version was evaluated to provide a different perspective on the installation process. Even though external modems have traditionally earned respect as the easiest type to install (no IRQs and jumpers), this is no longer the case with the onset of Windows 95 and Plug and Play standards. The Cardinal's modem installation through the serial port was straightforward, but not much faster or easier than either the US Robotics or Supra internal units.

The Cardinal's installation software came in two formats: 3.5-inch diskettes for the FaxTalk Messenger and a CD-ROM for the extra "bonus" items such as the Televox Internet Telephony and Anyware Antivirus software. It would have been simpler if everything was packaged in a single CD, but the installation was painless nevertheless.

Because the Cardinal's modem uses the same software as the Supra, the features and capabilities are identical. This means it offers all the bells and whistles previously described: user friendly interface, unlimited voicemail boxes, remote message retrieval, pager notification and so forth. The Cardinal also offers distinctive ring support which is absent in the Supra unit.



Another advantage of the Cardinal over the Supra or US Robotics is that it offers two types of technology that allow you to talk and transmit data during the same call: AudioSpan (simultaneous voice and data) and VoiceView (alternating voice and data). This gives Cardinal users additional flexibility should multiple game playing or document sharing become an important part of your daily life.

And Cardinal boasts a lifetime warranty—compare this to the five-year warranty offered by Supra or US Robotics. In reality, however, no one keeps modems for longer than a few years, so this is probably not a critical factor.

Like the Supra unit, the Cardinal speakerphone suffered a bit from feedback noise that echoed through the PC speakers (even with built-in echo-cancellation technology).

The Cardinal modem appeared robust and reliable, but it does not stand out as the benchmark among the three.

Final thoughts

Because the differences among the three modems are relatively minor, the final buying decision may simply come down to the actual street prices in your own city and your preference for specific features. As well, check out the manufacturers' Web sites and find out what the cost would be for upgrading or trading-in to a 56Kbps unit when the details are finalized sometime down the road.

Based on what I've seen and experienced, though, I would go for the high quality US Robotics or value-packed SupraExpress. ❑

Contact

Cardinal Web site: http://www.cardtech.com/

Supra Web site: http://www.supra.com

US Robotics Web site: http://www.usr.com

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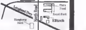

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BY STEVE HALINDA AND TIM BINGHAM-WALLIS

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It's 6:30 a.m. Your trusty alarm clock—the one you love to hate—wakes you up to the sounds of *Crazy World*. Just what you needed, a song to remind you of what awaits you after the sun decides to make its presence known (which won't be for another 18 minutes yet, by the way).

You have 30 minutes to swallow a couple of doughnuts, drown 'em in some coffee, make yourself presentable and be on your way. If you make it, you get to impress the board of directors with your new proposal of how you're going to save the company $5.2 million over the next two years. If you're late, they'll more than likely can you on the basis that not only were you tardy, but that you're a raving lunatic for proposing such ideas in the first place.

You give yourself a last glance in the mirror, and can't help but smile. You've been up nearly the entire night putting together your report, complete with three-dimensional pie charts, knowing full well you'll make vice-president in under five years (assuming of course that they buy your somewhat eccentric ideas). One last check through your briefcase reveals an unimaginable terror. You have yet to make a printout of your report. As panic begins to set in, your overactive imagination begins to explore a world of new possibilities. However, getting fired and unemployment insurance tend to be the most vivid of images. Running upstairs, you quickly throw the power switch on your computer and begin talking to it, actually more like pleading, in hopes that it will somehow make everything right.

After all, it was only last month that you spent $5,000 on it, making sure you got all the bells and whistles. The latest 200 MHz Pentium Pro processor is at the heart of the system, followed by 64 MB of RAM, and a hard drive with more room than your upstairs level.

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Without realizing, your mind begins doing a bit of arithmetic. At 60 characters per second in "Letter Quality Mode", you should be out of the house in about ... 76 minutes!

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Continued on page **72**

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ATI M64 PCI 2M DRAM w/MPEG
15" 1280x1024 .28 LR NI digital
17" ATX tower case w/ CSA power
104 Win'95 enhanced KB
Logitec mouse with pad

P5-100/120/133	**$1200/1200/1340**
P5-150/166/200	**$1400/1540/1800**
P5-MMX166/MMX200	**$1670/2000**
w/ 32M EDO	+$88
w/2.1G	+$40
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w/ 8x/12x CD-ROM	+$130/145
w/ 16bit sound/ SB16pnp	+$35/80
w/SB32PnP /SB64AWE	+$140/245
w/ 33.6 Voice / USR voice	+$100/150

Intel Pentium Pro 180mhz $1730

ATX Style

Intel Pentium Pro (P6) CPU/256k
Intel Venus w/Natoma 440FX
EIDE, 2x16550 Parallel
32M EDO 72pin 60ns
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17" ATX tower case w/ CSA power
104 Win'95 enhanced KB
Logitec mouseman/MS v.2 with pad

PPro P6-200 system	**$1900**
DUAL P6 /One 200mhz CPU	**$2200**
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w/ MGA Millenium 2/4M	+$140/240

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DIMM 32M/64M 168pin	$200/440
ECC DIMM 32M/64M	$240/445
INTEL MMX 166/200	$520/890
AMD K5-75/100/133	$58/90/120
Intel P5-100/120/133	$130/160/200
Intel P5-150/166/200	$250/395/655
Intel P6-200 256k/512k	$870/1750
6x86P150+/166+	$120/195

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GA586HX 512k PBC/MMX	$190
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Seagate 1.2/1.7/2.1	$250/275/315
Seagate 2.5G	$340
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Quantum 4.3G Wscsi/UW	$1260/1300
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VESA 32bit 2x16550	$35
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Adaptec 2940/2940ultra	$240/250
Adaptec 2940W/2940UW	$290/310
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Ditto 800M int/ext	$155/180
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DC2120/2120XL	$18/25
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NEC P1150/Sony20SF	$2680/1980
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PCI 64 w/MPEG 1/2M	$45/65
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104KB/Fujitsu8725/4725	$20/30/60
Microsoft Nature Kbd	$85

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3Com Ether PCI 509B (10B)	$150
3Com Ether PCI 590 (Combo)	$190
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NT 4.0 Server 5 /10 user	$890/1100
NT 4.0 Workstation	$280

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DESKTOP LASERPRINTER SURVEY

	Brother HL-730	Brother HL-760	Hewlett-Packard LaserJet 5L	Hewlett-Packard LaserJet 6P
Max. resolution (dpi)	600x600	1 200x600	600x600	600x600
Max. rated speed (ppm)	8	8	4	8
Memory (standard/max)	512KB / 2 MB	1 MB / 33 MB	1 MB / 9 MB	2 MB / 50 MB
Accepts standard SIMMs	No	Yes	No	Yes
Interfaces (standard)	Bi-directional parallel	Bi-directional parallel	Bi-directional parallel	Bi-directional parallel LocalTalk, Infrared
Interfaces (optional)	Serial	Serial		
Resident fonts	24	81	26	46
PCL/Postscript support	PCL 5e/None	PCL 5e/None	PCL 5/None	PCL 6/None
Standard paper capacity	200 sheets	200 sheets	100 sheets	350 sheets
Paper sizes	Letter, legal, envelope, labels, executive transparencies, A4, A5, B5	Letter, legal, envelope, labels, executive, transparencies, A4, A5, B5	Letter, legal, envelope labels, executive, transparencies, A4, A5, B5	Letter, legal, envelope, labels, executive transparencies, A4, A5, B5
Cartridge life (pages)	2 200	2 200	2,500	4 000
Duty cycle (pages/month)			2,500	12,000
Dimensions in cm (WxDxH)	36 6x35.3x24 8	36 6x38 4x24 8	33 5x31 2x22.9	40x44 5x20
Dimensions in inches (WxDxH)	14 4x13 9x9 6	14 4x15 1x9 6	13 2x12 3x9	15 75x17.52x7.87
Price	$549 ESP	$649 ESP	$699 SRP	$1289 SRP
Warranty	1 year	1 year	1 year	1 year
Contact	800-361-6466	800-361-6466	800-387-3867	800-387-3867

Note ESP = Estimated street price SRP = Suggest retail price

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Lowest priced scanner able to output high quality images

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Top rated scanner. EPSON's strength is being able to mass produce quality $1320

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$999

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Now includes Live Picture SE

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DESKTOP LASERPRINTER SURVEY

	Lexmark Optra E	Lexmark Optra Ep	Okidata Okipage 4w	Okidata OL600e	Xerox DocuPrint 4508
Max. resolution (dpi)	600x600	600x600	600 dpi class	600x600	600x600
Max. rated speed (ppm)	6	6	4	6	6
Memory (standard/max)	1 MB / 5 MB	2 MB / 6 MB	128KB/128KB	1 MB / 16 MB	2 MB / 34 MB
Accepts standard SIMMs			N/A		Yes
Interfaces (standard)	Bi-directional parallel	Bi directional parallel	Bi directional parallel	Bi-directional parallel	Bi directional parallel
Interfaces (optional)	Serial, Ethernet	Serial Ethernet			Serial
Resident fonts	26	85	None	44	46
PCL/Postscript support	PCL 5/None	PCL 5/Level 2 Emulation	PCL 4 5/None	PCL 4 5/None	PCL 5e/None
Standard paper capacity	150	150	100	100	250
Paper Sizes	Letter, legal, envelope, labels executive transparencies, A4, A5, B5	Letter, legal envelope, labels executive transparencies, A4, A5, B5	Letter legal envelope, labels executive, transparencies, A4, A5, B5	Letter legal, envelope, labels executive transparencies, A4, A5, B5	Letter legal envelope, labels executive folio transparencies, A4, A5, B5
Cartridge life (pages)	3 000	3 000	1 000	2 000	5 000
Duty cycle (pages/month)	10,000	10,000	1,000	6,000	8,000
Dimensions in cm (WxDxH)	34 8x24 6x22	34 8x24 6x22	31x19x15	32x36x16	36x36 6x18 3
Dimensions in inches (WxDxH)	13 7x9 7x8 6	13 7x9 7x8.6	12 2x7.5x5 9	12 6x14.2x6 3	14 2x14 4x7 2
Price	$749 ESP	$1069 ESP	$499 SRP	$688 SRP	$999 SRP
Warranty	1 year	1 year	1 year	1 year	1 year
Contact	800-358-5835	800-358-5835	800-654-3282	800-654-3282	800-939-3769

Note: ESP = Estimated street price SRP = Suggest retail price

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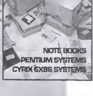

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1 44 mg Floppy drive 512K cache
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Keyboard Logitech Mouse, Windows 95
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Pentium Processor 100 Mhz
10 4" TFT SVGA Color
1 4G Hdisk 16 meg ram
TouchPad, 6X CD-ROM
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1 44mg Floppy Drive
PCMCIA slots
1 yr warranty
built in sound + speakers
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Intel Pentium 133Mhz
12.1" TFT Active Color
1.2G Hdisk, 24 meg ram
TouchPad 10X CD-ROM
6 3lb, NiMH Battery
1 44mg Floppy drive
Windows 95, PCMCIA slots
Built-in Sound & Speakers
1 yr Warranty
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Intel P120 Mhz
16 meg ram 256k cache
1 6G Hdisk 1 44 meg Floppy drive
Enhanced IDE/IO Controller
Cirrus Mpeg 1 meg PCI
14" NI LowRad SVGA Monitor
Win 95 Keyboard mouse
High Speed Serial Ports
ESS 1868 16 bit Sound Card
4x CD-ROM
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Intel P150Mhz System
16MB EDO SIMM RAM
1 6G Hdisk, 1 44 meg Floppy drive
Enhanced IDE/IO Controller
Cirrus MPEG 1meg PCI
8X CD-ROM, ESS 1868 16bit
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High Power Speakers
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Windows 95 Full Version
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Canon B640 Plain Paper Fax Machine $579
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ATI 3D to TV 4 meg SDRAM, Output VGA image to TV $229
ATI TV Tuner input source for TV VCR $149
Modems
SupraExpress 33 6 Voice Fax/Modem Internal $139
U S Robotics 33 6 Voice External Fax/Modem Duplex Phone $289
MegaHertz 28 8 PCMCIA notebook Modem with Fax $259
Brother HL730 Laser printer 600dpi 2 yr warranty $488
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- 15" Noninterlace SVGA Monitor Low Rad
- Pipeline Burst Cache 512K
- Sound Blaster 16 w/Powered Speakers

Options: (With the Purchase of System)
- Upgrade to 32mg EDO RAM $109
- Upgrade to 32 SDRAM $219
- Sceptre 17" Multimedia $399
- MAG 1795 .26dp 17" SVGA $499
- ATI 3D Expression 2mg PC to TV $129
- Matrox Mystic 2 meg SDRAM $169
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- US Robotics 33 6 Voice/Fax/Modem $169

comes with 16 meg EDO RAM, 12x CD ROM Drive, 15" SVGA Monitor

CPU Speed	Intel Pentium Price	6x86/AMD K5 Price
P133	$1879	$1799 K5
P166	$2099	$1869 6x86
P166	$2259 MMx	
P200	$2559 MMx	$2199 6x86

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Pentium Pro 200 MHz ATX → $2999

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NexType 586 Mini Station
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>Sony 1.44 Floppy Drive
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>104-Win95Key Keyaboard
>Qtronix Lynx30 Mouse w/ Mouse Pad
Eurone
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$999/1029/1099/1139/1299/1549
Cyrix 6x86 P150+/P166+ $1039/1089

NexType 586 Super Station
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>**Asus T2P4 w/256K BP Cache**
>OnBoard EIDE Mode 3/4 & I/O
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>Supra 33.6 Int. FaxVoiceModem
>19" Mid-Tower Case w/ 230W
>Fujitsu 8725 104-Win95Key Keyaboard
>Logitech Mouse Man w/ Mouse Pad
ASUS ATI Seagate CREATIVE
Intel Pentium 100/120/133/150/166/200
$1775/1785/1845/1885/2055/2299
Intel Pentium MMX 166/200 $2250/2565
Cyrix 6x86 P150+/P166+ $1775/1845

NexType 686 Pro Station
intel Natoma (440FX)
>***Tyan Dual P6 1662 Mother Board***
>OnBoard EIDE Mode 3/4 & I/O
>***32Mb EDO RAM 72Pin 60ns***
>Sony 1.44 Floppy Drive
>***Seagate 2.5Gb EIDE Mode 4***
>ATI Videobooster Mach64 2MB PCI
>***AcerView 54e 15" Non-Int. Low Rad. Monitor***
>Creative Labs Sound Blaster 16 PnP w/Speaker
>8X CD-ROM Drive EIDE
>19" Mid-Tower Case w/ 230W
>Fujitsu 8725 104-Win95Key Keyaboard
>Logitech Mouse Man w/ Mouse Pad
TYAN ATI Seagate CREATIVE
Intel Single Pentium Pro 180/200
$2738/2918
Intel Dual Pentium Pro 180/200
$3378/3748

AOpen Super Station
intel Triton II (430HX) Cyrix
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>***OnBoard EIDE Mode 3/4 & I/O***
>***32Mb EDO RAM 72Pin 60ns***
>***Sony 1.44 Floppy Drive***
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>***ATI 3D Xpression + PC2TV 2MB SDRAM PCI***
>***AcerView 76ie 17" Non-Int. Low Rad. Monitor***
>***Acer AW32 Pro PnP Wave Table Sound Cardkid***
>***Acer 8X CD-ROM Drive EIDE***
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>***AOpen 18" Mid-Towner Case/w 200W CSA***
>***Fujitsu 8725 104-Win95Key Keyaboard***
>***Logitech Mouse Man w/ Mouse Pad***
ACER Seagate ATI
Intel Pentium 100/120/133/150/166/200
$2248/2258/2318/2358/2528/2778
Intel Pentium MMX 166/200 $2728/2928
Cyrix 6x86 P150+/P166+ $2258/2318

Win95 R2 $109.00
(With System Only)

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P55TVP4 430VX 256K BP/DIMM	$169
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Intel	
Pentium100/120/133	$139/150/215
Pentium150/166/200	$265/445/665
Pentium MMX 166/200	$645/845
Pentium Pro 180/200	$655/890
Cyrix 6x86 P150+/166+	$150/210
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100SX 15"/100SF 15"	$535/62
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17GS 17"/17PS 17"	$865/99
GT770 17"/PT770 17"	$960/1099
ATI	
Videoboost 64 1MB/2MB	$90/10
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Matrox	
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Adaptec	
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Lasers for the desktop

Continued from page **68**

Decisions, decisions

When it comes to buying a printer for the home, a number of considerations should be made. Ask yourself: "What will I be printing more of, text or graphics? Do I need color, or will black ink suit my needs? How fast does it need to be? Am I concerned about expandability? What are the costs of consumables? How much do I want to spend?" If you're shopping for a new laser printer, a bit of research is definitely worth your time, and this month's Test Lab is a great place to start.

But before we go any further, you should know that trying to find "the perfect printer" is about as easy as trying to find an honest politician. Finding that perfect printer is not possible because no single printer can ever be perfect for every individual's needs.

You can try to find a printer that best suits your own needs, but even then, you may find yourself having to decide between a particular feature or saving a few bucks. A few years ago, consumers would be faced with the basic decision of choosing between an inkjet and a laser printer. Today, it's not quite as simple. Having decided upon a particular class of printer is only the first step. You still have to choose the set of features you want in that printer.

Many things have changed over the years in the world of printers. It used to be that you could tell right away whether a printout came from a 300 dpi or a 600 dpi printer. Thanks to innovations like Hewlett Packard's REt, (Resolution Enhancement technology), it can now be a struggle just to differentiate between the same two classes. The following should help you get started in determining what you should look for in a good entry-level laser printer.

Printer basics

Printer resolution

The measure of a printer's output quality is known as its resolution. This is most commonly measured in dots per inch (dpi), which indicates the number of dots that can be placed in one linear inch of printing. Generally speaking, the higher the resolution of the printer, the better its output quality. Modern laser printers are capable of resolutions as high as 1,200 dpi.

If you've ever seen a particular printer advertised as "true 600x600 dpi," it means it is capable of placing an actual 360,000 dots in the space of one square inch, without having to use any kind of image enhancement. At this resolution, a typical 8.5x11-inch page would have 33,660,000 dots if it were being printed on from corner to corner.

To give you an idea of why a printer's resolution is of such importance, consider the following example. Let's say you took a picture of your pet dog and wanted to scan it so that you can make printouts on your brand new personal laser. If you were to print that image on a printer that could only print 100 dpi, the end result would be anything but satisfying. At 100 dpi, there just wouldn't be enough dots in the printout to reproduce the details of the original photograph. The image would look distorted and blocky.

However, that same image printed at 600 dpi would look much closer to the original photograph, because now you have 36 times the amount of total dots that go into making up that image. When considering printer resolution, aim for 600 dpi, and only settle for 300 dpi if your budget won't allow anything more. But judging by the small price difference for most 600 dpi printers, it's well worth the extra investment. And if you feel that you don't really need 600 dpi resolution, never forget to plan ahead. What you may not desire today could be a necessity tomorrow.

Resolution Enhancement technology

With the introduction of its LaserJet III printers, Hewlett-Packard introduced what they've termed Resolution Enhancement technology. With REt, HP made it possible to improve the print quality of its 300 dpi class of printers, without actually increasing the true output resolution of the printer. The trick involves smoothing the edges of text and graphics by carefully placing certain dots in specific places on the page, mainly at the edges of curves that make up the printed characters or lines.

For example, let's say you were printing something that gave you a diagonal line on the page. Upon close examination, you would notice jagged lines and a staircase shape rather than a smooth, solid line. The printer would place dots where they wouldn't normally be placed, such as in the corners of the diagonal lines, thereby reducing the staircase effect and giving the printout a sharper overall appearance.

Similar technologies by various companies have been implemented recently giving rise to a new class of printers, commonly known as the "dpi class." For example, you may see a printer advertised as being "600 dpi class," which should right away tell you that it is, in fact, a 300 dpi printer with some sort of enhancement technology to improve print quality. Likewise, it is also possible to get "1,200-dpi class" printers which are, as you may have guessed, true 600 dpi printers.

Printer speed

Whether you're looking for a high resolution laser or a color inkjet printer, an important factor you will want to consider is the rated print speed of the particular printer. Although it may sound like a simple concept, there are actually a fair number of variables that go into determining how fast a particular print job will get done.

Among these factors are key issues such as the desired output resolution, the type of data being printed, and the type of processor inside the printer. If you want to print a report from a DOS-based word processor (e.g., WordPerfect 5.1), you would be giving the printer very little work to do. It's very likely that the font(s) you've used in your report are contained in the printer's ROM, so all it has to do is begin the printing process.

However, if you were printing a graphical image from your favorite paint program, the image would have to be "rasterized" before the print process would begin. This involves a communication process between your computer and the printer's processor (also known as the raster image processor, or RIP) where information pertaining to the image on the screen is sent to the printer. The printer's processor then needs to take all that information, and translate the image into a series of dot patterns.

Raster image processors are almost always of the RISC (reduced instruction set) variety. These chips are ideal for printer design because they are capable of carrying out a

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Lasers for the desktop

Continued from page 72

series of instructions faster than conventional microprocessors

Once the rasterization process is complete, a bit-image is produced. This is, quite literally, a blueprint of the page that is about to be printed. This blueprint contains a complete layout of every single dot needed to make up the final image. At this stage the printer now has all the information it needs to begin printing. It knows how many dots will be used to construct the printed image as well as the exact location of those dots with incredible precision. And yes, you guessed it! All of this information must be stored in RAM—usually inside the printer—but not always, which brings us to our next subheading.

Printer memory

Much like your computer, any information the processor must deal with has to be stored in RAM. How much RAM should your printer have? Once again, this all depends on what you will be doing with your printer. For printing straight text, the very minimum will suffice. However, if your needs include complex graphics-intensive images, you will want to consider investing in a substantial amount.

Either that, or buy a printer which has the capability of forcing your PC to use its own RAM for storing the information. Obviously this has both advantages and disadvantages. The obvious advantage is that you could cut several hundred dollars off the price of a printer configured with a few extra megabytes of RAM.

It may sound unrealistic, especially since RAM prices are so cheap these days, but there's a little bit of trickery involved here. If the printer you buy can accommodate industry standard SIMMs, you're in luck. Just pay a visit to your nearest retailer and buy an 8 MB or 16 MB upgrade for your printer (assuming the printer can handle that amount) for under $100.

But if the printer doesn't support standard SIMMs, you're stuck with having to buy memory modules from the manufacturer, which can run you as high as $200 or more for just 2 MB. Let's assume for the moment that you want to get a rough estimate as to how much RAM your printer should have.

First, it's important to understand how a printer utilizes memory. As was explained earlier, images must undergo a rasterization process before being printed. It is this rasterized image that gets stored in RAM. Once again, let's assume your image will occupy the entire page, from corner to corner, using the whole surface of an 8.5x11-inch sheet of paper. If your desired image resolution is 600 dpi, the total RAM required can be found by the following formula: multiply your vertical resolution by your horizontal resolution by the vertical and horizontal dimensions of the desired image size (in inches).

Using our example above, our calculation would look as follows: (600 x 600 x 8.5 x 11). This will yield a result in bits, which you will then want to divide by eight to get the total number of bytes, which in this case is 4,207,500 or 4.01 MB. What this means is that if your printer has no way of making use of your PC's RAM, you will have to provide it with all of the physical RAM.

Our above example was an extreme case. Not only will you rarely print large images that occupy every square inch of the page, but even when you do, you'll have to settle for slightly less usable space on the page due to margin limitations.

For most users' everyday needs, a printer configured with 1 MB or 2 MB of RAM will do the trick. Many printers available today will also have some sort of memory management system implemented, which will use data compression in order to reduce the amount of memory required to store the rasterized image. This can be a low-cost alternative to equipping the printer with more RAM, especially so if the printer requires proprietary memory modules.

Hewlett-Packard uses the term Memory Enhancement technology (MEt) to describe their memory management technique, while Lexmark printers use their own RAMSmart intelligent memory management. Other manufacturers have implemented similar designs under various names.

The final scoop

Although the number of considerations can be overwhelming at first, choosing a printer that would best fit your printing needs isn't something that you should lose any sleep over. If you can spare the extra dollars, we would definitely recommend a printer capable of true 600x600 dpi resolution. While it may be true that certain resolution enhancement tricks can go a long way in improving a printed page, it's still not the same as looking at a page printed at higher resolutions.

Look for a printer that uses a straight paper path. This will save you the headaches that come with those annoying paper jams.

Most entry level units will have a rated print speed of 4 ppm, which should be more than adequate for occasional printing that the home user requires. By digging a little deeper into your pocket book, you'll have the option of going for a 6 ppm model. Is it worth the extra cash? That's entirely up to you and will depend on how much importance you place on speed.

And what about RAM? We recommend having at least 512KB of physical memory inside the printer. If the printer handles standard SIMMs, the extra $40 or $50 you would spend on another 4 MB would be a smart investment. With some careful planning and a bit of shopping around, you can end up with a unit that will give you superb quality printouts at a price you may have never thought possible.

Our captives

We compared several printers, ranging from entry-level to those suitable for small business environments. Our only criteria was that they had to be priced under $1,000 (give or take a few shillings).

Our candidates ranged in print speeds from 4 ppm to 8 ppm, with many delivering true 600 dpi print resolutions. Prices ranged from Okidata's model 4w at a suggested list of $499 to Hewlett Packard's 6P with an estimated street price of $1 040.

Brother HL 730 and HL 760

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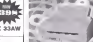
Brother's model HL-730 is a printer aimed at both home and small business environments. This unit is a great example of a good performing printer that is still within the confines of most consumers' budgets. The HL-730 is capable of printing at true 600x600 dpi, while it's big brother the HL 760 can handle up to 1 200x600 dpi. Both printers produced great looking pages involving text and graphics. Rated print speeds on both models is at six pages per minute.



The 730 has 512KB of RAM standard, and is upgradable using proprietary memory modules up to 2 MB. The 760 comes standard with 1 MB of RAM and is expandable to a generous 33 MB with the addition of industry standard SIMM modules. Common to both models is the 200-sheet input capacity and PCL 5e support.

Thanks to a straight paper path design you won't have to worry as much about paper jams or curls. You can expect your cartridges to last up to 2,200 pages at five percent coverage, but realistically the cartridge life will depend heavily on the type of print jobs you perform. The starter cartridge included with both models is good for approximately 1 000 pages.

Each model is capable of printing onto a wide assortment of paper types. The estimated street price on the HL-730 is $549 and $649 for the HL-760. The warranty on each printer is one year.

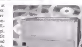
Hewlett-Packard 5L

HP's entry level candidate for this month's review was the LaserJet 5L. Well known to many people, the 5L can be found at most retailers for about $650. The 4 ppm printer is capable of resolutions up to 600x600 dpi and comes standard with 1 MB of RAM that can be further expanded to a total of 9 MB using proprietary modules.

The 5L supports PCL 5, and comes with 26 resident fonts, has a 100-sheet input tray and will print on a wide assortment of paper. Toner life is rated at 2,500 pages. Text and graphics quality were good with no discernable problems noted.

Hewlett-Packard 6P

Aimed toward the small/home office and business users, the LaserJet 6P offers features not common among printers of the same class. To start off, it is capable of printing at speeds of up to 8 ppm. If you're the type who doesn't like to wait around for their print jobs to finish, definitely consider this unit.



It has a print resolution of 600x600 dpi and comes standard with 2 MB of RAM, which can be upgraded to a whopping 50 MB using standard 72-pin SIMMs. Standard port configuration includes both a large and small parallel port, as well as LocalTalk and infrared ports.

Paper handling is exceptional, with two input sources, a bottom bin that stores up to 250 sheets as well as a flip-down tray capable of holding an additional 100 sheets. The 6P supports the new PCL 6 format and comes with 46 resident fonts.

To ensure maximum productivity, the cartridge life is rated at 4,000 sheets and the printer's duty cycle is rated at 12,000 pages per month. Our test printouts were of excellent quality, both graphics and text. The 6P has been spotted selling on the street for as low as $960, but the average street price tends to be around $1,030. If you need a reliable workhorse around the house or office, the HP LaserJet 6P is definitely a printer worth considering.

Lexmark Optra E and Optra Ep

No strangers to us here at *TCP* Labs, Lexmark printers are known for their superior design and engineering, not to mention exceptional print quality. This month, we received two very similar printers, the Optra E and Optra Ep.

On the outside, both printers are identical. Each model features true 600x600 dpi printing at up to 6 ppm. The Optra E comes standard with 1 MB of RAM and is expandable to 5 MB, whereas the Optra Ep has 2 MB as standard configuration and can be expanded to 6 MB in total.

The Optra E also supports 1 MB of flash memory, which can be used to store anything from frequently used fonts to forms to macros. Both models feature 150-sheet input trays, cartridges rated at 3,000 pages, duty cycles of 10,000 pages per month and optional networking support.

The most notable difference in the two models is that the Optra Ep adds Postscript level-2 emulation support as well as 86 resident fonts—that's 60 more than is found in the Optra E. Standard issue with both printers is Lexmark's MarkVision print management utility. With MarkVision, users can take control of printer functions in a well laid out graphical interface where you can monitor printer status, fine tune settings and toggle various options.

Our printed tests turned out just as we had expected: excellent. Text was sharp and black. Graphical images were printed with excellent halftones, and there were no signs of streaks or smudging. One of the most attractive features about these printers is exactly that--their attractive appearance. Not only are they aesthetically pleasing, but take up very little room on your desktop. Both models offer great performance and reliability. The Optra E and Optra Ep have an estimated street price of $749 and $1,069 respectively.

Okidata Okipage 4w

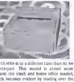
Okidata's latest entry-level design aimed primarily at the home user is this Okipage 4w. When we saw it, the first thing that came to minds was "Wow ... look how small that is!" This 4 ppm GDI printer lacks any built-in support for PCL emulation, meaning you'll need either Windows 3.x or Windows 95 to use it.

Support for DOS applications is provided, but you'll have to be in a Windows DOS prompt to use it. The Okipage 4w is a 600 dpi class unit, which managed to surprise us when it came to reviewing print samples. Text output was a solid black, and incredibly sharp, even on small fonts. Graphics looked good, but we had to tweak the contrast levels a couple of times before our graphical image came out looking the way it did on other printers.

The 4w comes with 128KB of RAM that cannot be upgraded, meaning you'll have to allow it to use your PC's memory to print complex images. If you buy this printer before March 31, Okidata will throw in a bundle of products worth approximately $140. The bundle includes the following: a Sprint Canada 30-minute pre-paid calling card, a Motorola beeper with two months paging service when signing with Pagenet Canada, Claris Draw graphics package, Claris Impact for business charts and diagrams, 3M Post-it notes software, Living Home interior design software on CD-ROM and a free issue of *Small Office Computing* magazine.

To receive the package, the customer must fill out a coupon, which is made available at the time of sale, then mail or fax it to Okidata. With a one-year overnight-exchange warranty and a street price near $400, this printer is an attractive option.

Okidata OL600e



The OL600e is in a different class than its 4w counterpart. This model is aimed more towards the small and home office market, which becomes evident by reading over the technical specifications. The 600e features true 600x600 dpi printing at up to 6 ppm. Standard configuration includes 1 MB of RAM, which is expandable to a total of 18 MB.

When examining the unit to determine if it supports standard SIMM modules, we were surprised to find no mention in the manual of how to perform a memory upgrade. Searching for any type of compartment failed to turn up anything, so we carefully opened up the unit in hopes of uncovering the elusive RAM socket. Once again, no luck.

All RAM mysteries aside, the printer is a good performer, delivering solid black text and well-reproduced graphics.

The standard input paper tray can hold up to 100 sheets. Cartridge life is rated at 2,000 pages, and the unit's duty cycle is up to 6,000 pages per month. The suggested retail price of the 600e is $699, and includes a one-year warranty identical to the 4w.

Xerox DocuPrint 4508

The DocuPrint 4508 from Xerox is the kind of printer you first look at and immediately know that it'll be ready for whatever you may decide to throw at it. (Not literally,

➤

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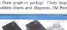

of course—we would like to state for the record that we have never thrown anything at any of our test equipment, nor have we thrown the equipment itself regardless of how much grief it may have caused us And no imagining it is not the same thing —SH)

With print resolutions of 600x600 dpi and a maximum print speed of 8 ppm the DocuPrint 4508 is well-suited for individuals with greater printing needs Standard on the 4508 is 2 MB of RAM which can be easily upgraded to a maximum of 34 MB with a 72-pin SIMM module With an input paper tray of 250 sheets and support for a wide variety of paper types the 4508 is a ready-to-go, no nonsense machine

Print quality was among the best of the printers in this survey Text was solid black, and remained consistently sharp, all the way down to the smallest of fonts Graphics turned out very crisp but were slightly darker than expected However a few adjustments quickly cleared this problem up Listed at just under $1,000, this printer is ideal for a home-office environment

COMPUTER PAPER

Editor's CHOICE

It's hard to recall a time when choosing the Editors' Choices was so difficult. All of the printers we've looked at this month are very capable and would make a great addition to any home What makes things so difficult is the broad range of features and prices that are found amongst the group

A feature that is lacking on one printer with a low price tag may be included in another one with a much higher price tag So how did we end up picking our winners? By answering one simple question which printer would we buy and take home to call our own?

Performance: Lexmark Optra Ep
In the category of performance the Optra Ep gets our vote. It had all the qualities we wanted in a printer excellent output quality, fast print speeds expandability and reliability and uniqueness

Overall value. Brother HL 760
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Many business owners who are unable to access money in terms of debt or equity capital may be forced to reassess their needs, resources, and business management. For example, quick handling of accounts receivable, effective inventory control, customer prepayments, and cutting down on unnecessary expenses can free up funds not otherwise available. It forces your business to operate in a more efficient fashion. This will lessen your need to look outside the business for financing. Some of the various methods of internal financing include the following:

Customer prepayments: A business can encourage customers to make a deposit, prepayment, or payment on delivery. This is a very common technique in the mail-order business and in service-type businesses.

Inventory control: Effective inventory control will ensure there is the right amount of stock to satisfy customer demand. Determine guidelines for proper inventory purchases. Adjust your purchases to meet the peaks and valleys of your annual business sales. Too much money tied up in slow-moving inventory, debt-servicing payments on inventory loans, and lost customer loyalty due to insufficient stock is costly to your business.

Collecting receivables. Receivables can be reduced by tighter credit-granting policies, better monitoring of accounts, and more effective collection policies. You may wish to consider credit cards or cash only as a means of sales.

Delayed payables. Establishing a good working relationship with your suppliers can result in extended payment terms. Make certain they are aware of your loyalty to that firm and your repeat business. You may be able to negotiate a discount on volume or regular purchases.

Restructuring payment arrangements: There are times when a small business is not able to maintain monthly payments plus interest on loans or repayment to creditors. By using creative negotiating techniques, there are ways of getting around short-term problems. Some alternative repayment plans that you may consider include:

- a period of grace for principal loan payments during the start-up period of your business operation,
- blended payments that feature a long amortization period resulting in low payments of principal in the early years,
- graduated payments, that is, low payments on principal in the early years and higher ones later on
- and payments of principal during the high season only, so that the business does not have a cash-tight period during the low sales volume season.

Selective product lines. Only handle product lines for which you get the most favorable terms from the supplier and from which you have the highest sales turnover and profit margin.

Fixed assets: You may wish to sell your assets to a leasing company and lease them back, thereby freeing up cash for working capital purposes. On reviewing your assets, you may feel some are not necessary to the business and may be sold to free up additional cash. By purchasing secondhand equipment and machinery, you can reduce financial outlay.

Renting or subletting: You may decide to rent space for a store or factory rather than buying, to improve your leverage and your cash flow. By subletting space, you can offset your monthly payments, thereby increasing your working capital.

Stringent management: By reviewing the points discussed above to determine how to conserve on capital and save on expenses, financial resources can be freed up and the business risk minimized. The business owner should analyze the financial condition of the business on an ongoing basis by considering the following:

- Are salaries too high?
- Is the owner taking out too much from the company for personal earnings rather than keeping it in the company for working capital?
- How do the company's costs of goods and other expenses compare to other companies in the industry?
- Is the lease too expensive?
- Are supplies being wasted?
- How do actual expenses compare to budgeted expenses?

The business owner knows best where expenses can be trimmed from the operation. In addition to controlling expenses, the owner should always be looking for ways to increase profits, sell surplus inventory or assets, and maintain an effective receivables collection program. ❑

Douglas Gray, LL.B. is a Vancouver-based speaker, lawyer, columnist and author of 15 best selling business books, plus a real estate investment software program. His books include The Complete Canadian Small Business Guide *and* Home Inc.: The Canadian Home-Based Business Guide *(both by McGraw-Hill Ryerson),* Start and Run a Profitable Consulting Business *and* Marketing Your Product *(both by Self-Counsel Press).*

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PC workstations muscle in

BY GEOF WHEELWRIGHT

The announcement in late October that Compaq Computer was to make major moves into the high-end workstation market was more than just a drive by the world's biggest PC vendor to enter this high margin business. It was a clear signal that the days of dominance in this sector by RISC-based systems running variants of the Unix operating system were about to face one of their biggest challenges ever

It is no secret that companies such as Silicon Graphics and Sun Microsystems have already faced increasing competition from a growing number of existing suppliers using a combination of Windows NT and Pentium (and then Pentium Pro) processors. However, the very fact that Compaq s name is on these new boxes lends perhaps a new urgency to the threat that wasn't there before.

So what did Compaq announce?

Just exactly what is this threat to traditional workstations? In the case of Compaq, the threat is being made by the new Compaq Professional Workstation, which Compaq claims is the most "competitively priced feature-rich, standards-based workstation product available "

Compaq boasts that its first technical workstation family provides customers with "highly integrated and optimized Windows NT Workstation and Intel 200MHz Pentium Pro processor-based solutions" for running a wide range of specialized applications, as well as the kind of personal productivity software with which this platform had traditionally been associated

And in case there may be a few in the high flown world of the workstation who may not know much about its pedigree, Compaq went to considerable lengths in its announcement of the Professional Workstation to be as immodest as possible

"Compaq is a proven leader in driving industry-standard technologies into new markets, delivering cost-effective solutions, and capturing significant market share across multiple product categories, including the Pentium Pro processor server market," offered John T Rose senior vice-president and general manager of Compaq's enterprise computing products group "These successes, coupled with our

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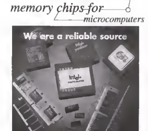

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renowned engineering capabilities extensive Windows NT systems expertise and partnering know how, have enabled Compaq to create—from the ground up—a robust workstation platform, complete with high-end graphics and multiprocessing capabilities, that delivers unmatched price/performance and unprecedented integration "

Unlike some past ventures outside its core PC market (such as its ill starred venture in the PC laser printer sector and TeleCompaq a decade earlier), Compaq appears to be much more than just testing the waters of the workstation business with the new products "Compaq is serious about establishing a leadership position in the workstation market and has created the infrastructure necessary to compete successfully in workstation environments that were once the exclusive domain of companies like Sun Hewlett Packard, IBM Digital Equipment and Silicon Graphics," says Rose

Some analysts including International Data Corporation (IDC) suggest that Compaq is making its move at just the right time after others have already blazed the trail for the success of NT systems in the workstation sector

"IDC forecasts that the Windows NT workstation market will grow at 44 percent a year through the year 2000 and that Windows NT workstations will outship UNIX workstations in 1997," said Tom Copeland, director of workstation research at IDC when the Compaq systems were announced. "With its experience in both the PC and server markets, Compaq is well positioned to become a significant player in the emerging Windows NT workstation market."

A measure of support

The other key factor in this move—at least from the Compaq perspective—is that the company is not going into it alone At launch, Compaq had 16 software and hardware vendors declaring their support for Compaq's entry into the workstation market, including "Wintel" ringleaders Microsoft and Intel Also along for the ride were independent software vendors (ISVs) in three market segments mechanical computer-aided design (MCAD), financial applications, and interactive-content development, and independent hardware vendors (IHVs) of professional 3D graphics subsystems

In fact Microsoft and Intel almost have more to gain from the success of Compaq's entry into the workstation business than Compaq, as they will reap huge benefits if Compaq starts an even bigger rush by other Windows NT based PC vendors to move into this sector

It should therefore come as no surprise that Jim Allchin Microsoft senior vice president of the desktop and business systems division, should be treating the announcement as a major boost for the credibility of Windows NT

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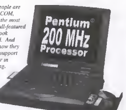

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provide customers with the performance, support, and integration they need to run the most advanced graphics and technically demanding applications," predicted Allchin

Perhaps more important over the short-term is the support of MCAD companies like Autodesk, Bentley, Parametric Technology Corporation (PTC), Structural Dynamic Resources Corporation (SDRC), and EDS/Unigraphics These companies produce software for engineers and designers to create 3D and 2D mechanical designs and drawings and analysis—and are key to cracking the traditional workstation market

In some cases, it would appear this support owes as much to good business as it does to good friends. For example, the ringing endorsement of Compaq's plans by Autodesk vice-president of corporate marketing Jim D'Arezzo sounds almost as enthusiastic as when D'Arezzo used to do a similar marketing job at Compaq

Despite this, it is clear that Autodesk—and the other supporters of Compaq—would not be waving the flag if they didn't believe it was worth making the investment in the NT workstation platform And the support is not limited to those in the engineering sector.

Compaq says that it has also developed relationships with financial ISVs such as the MarketNet Group and Dow Jones Telerate, which deliver financial information via multiple live feeds to brokers and analysts who make real-time, critical decisions

Perhaps not surprisingly, the company has worked closely with the Microsoft owned Canadian graphics specialist Softimage, which it says has certified the 3D graphics subsystem in the Compaq Professional Workstation, along with Kinetics and Adobe

Meanwhile, in recognition of the fact that many workstations operate in a "heterogeneous" hardware environment, Compaq has entered into an agreement with Hummingbird, a software vendor of PC to-mainframe communication services and PC to-UNIX connectivity software

The company says customers will be able to "try and buy" Hummingbird NFS Maestro and NFS Maestro Solo and evaluate several Hummingbird Exceed applications that allow customers to display UNIX based graphics applications running across the network. Compaq claims this should eliminate the need to have a secondary workstation for UNIX-based applications

Compaq further announced it expanded its relationship with ELSA Inc, a well known vendor of 3D graphics solutions used for high-end visualization 3D animation and CAD/CAE applications. Select Compaq Professional Workstation models will include the ELSA GLoria L graphics accelerator Future models of the Compaq Professional Workstation will also apparently include products from Intergraph Computer Systems, a pioneer of 3D graphics solutions for Windows NT in the areas of visual computing, CAD and engineering (and a company that has also produced its own NT workstations)

Finally, Compaq offers a glimpse ahead through the announcement of a "strategic alliance" with Integrated Computing Engines

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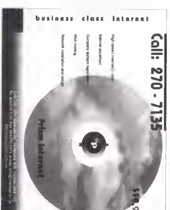

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(ICE) The aim of this alliance is to offer customers "a well-integrated rendering solution that delivers super-computing class performance" in future workstation products.

What is in the Compaq workstation?

Alliances and strategic announcements of software support however, will not win huge numbers of new customers for Compaq by themselves—particularly the workstation customers (ranging from financial and entry-level CAD professionals with 2D graphics requirements to engineers requiring graphics-intensive 3D capabilities) that Compaq says it is seeking

Much of that interest will have to be driven by what is on the spec sheet and the prices associated with those specifications On first inspection the baseline specifications look pretty good You get up to two 200 MHz Pentium Pro processors, Windows NT Workstation 4 0 (3 51 is available through a licence exchange agreement included in the box), a Wide Ultra SCSI controller, up to 512 MB of ECC DIMM memory 8x CD-ROM drives and an integrated Netflex 3 "auto sensing" network interface card (NIC)

According to Compaq this integrated network card is auto sensing in the way that it provides "transparent connection" to traditional 10Mbit/sec or high speed 100Mbit/sec Ethernet local area networks (LANs) To bring the display up to workstation standard, the 2D graphics-oriented models include a Matrox Millennium accelerator card with 2 MB of WRAM (expandable to 8 MB) and up to 1,600x1 280 resolution at 256 colors up to 64 MB of standard memory and up to a 4 GB hard drive Prices for these range from US$4 300 to US$5 300

Models designed for 3D graphics-intensive applications—which require fast shading and texture mapping—come with an ELSA GLoria L graphics controller This includes a 3D graphics accelerator, 8 MB of frame buffer memory (VRAM) and 8 MB of Z buffer memory (DRAM) upgradable to 16 MB one or two Pentium Pro processors, up to 128 MB of standard memory a three-button mouse for use with more complex CAD software and a 4 GB hard drive The dual processor system is also apparently optimized for multitasking and multithreaded applications that perform CPU intensive tasks such as final rendering used in the animation field These workstations range in price from US$8 200 to US$10,200

Compaq is also moving its PC approach to high-end software installation into the workstation market with the inclusion of its "SmartStart" installation and configuration CD software in all workstation models The idea of this is to let customers more easily install and integrate their operating system—as well as select "try and buy" UNIX connectivity applications and utilities

Also included are Compaq's management tools, which the company says "reduce the management complexity of networks and simplify the inventory management and troubleshooting of Compaq products" and help lower cost of ownership over the life of the workstation

Network managers, meanwhile may be happy to see the inclusion of Compaq Insight Manager which provides network administrators with fault configuration, performance, asset and remote management of Compaq workstations ❑

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PowerPC charts uncertain waters

BY GEOF WHEELWRIGHT

The ill-starred PowerPC effort bravely launched by Apple, Motorola and IBM half a decade ago is having a rough ride as it hits the age that most children start going to school. Backers of the PowerPC have been learning from the school of hard knocks lately as they have watched the most high-profile PowerPC user—Apple's Macintosh division—stumble from one rescue plan to the next (pun intended). This culminated in the much-ballyhooed deal that saw Steve Jobs agree to return to the company in December.

To get a further measure of the problems facing PowerPC, combine Apple's woes with the news in early December that Motorola and IBM were abandoning their efforts to continue having Microsoft Windows NT developed as a mainstream operating system alternative for PowerPC systems beyond NT 4.0.

This will leave most users the option of buying PowerPC systems with various versions of the Macintosh operating system (four of which are supposed to be in active use over the next 18 months) and certain flavors of Unix (including IBM's AIX). It is clear, from recent announcements by both Motorola and IBM's PowerPC development divisions that the companies realize much of their future lies with the Macintosh versions of PowerPC. However, a lot of energy also appears to be going into the production of PowerPC "reference platforms" that will be capable of running multiple operating systems at high levels of performance.

Doing the prep work

One of the most high profile of these has been the Yellowknife PowerPC Platform Reference Design, which was launched with great fanfare at Fall Comdex last year with the aim of being compliant with the PowerPC Platform specifications and capable of booting Mac OS, Windows NT and other operating systems (including AIX). Motorola says it is supposed to help manufacturers develop quick-to-market, volume PowerPC Platform systems.

"The successful use of low-cost, high performance PowerPC microprocessors and industry-standard peripherals to run the Mac OS and Windows NT is added proof that the PowerPC Platform is a compelling solution for rising PC ownership costs," boasted Phil Pompa, director of marketing in the Motorola RISC microprocessor division when Yellowknife was announced at Fall Comdex

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Manufacturers wanting to produce systems based on the design have been quick out of the starting gate. Mac cloner UMAX Computer Corp., for example, has said it intends to use the Yellowknife reference design to build the company's first PowerPC Platform systems, expected early this year.

"Yellowknife is the ideal reference design upon which to build PowerPC Platform systems," suggests Andy Chang, senior vice-president of worldwide sales for UMAX. "The performance capabilities of Yellowknife give UMAX the room it needs to design low-cost, multi-OS computers that combine robust features with the natural advantages of the PowerPC microprocessor."

All of this is music to the ears of Jeff Nutt, program manager for PowerPC reference platforms at Motorola. Interviewed in early December he said that response from manufacturers has been huge since the Comdex announcement.

"There has been lots of interest from value-added resellers who currently only handle one platform or the other," he explains. "They see it as a chance to offer differentiation — to offer Mac-compatible as well as Wintel solutions."

Nutt admits, however, that not much will happen with Yellowknife (at least in terms of finished product) until Motorola gets the CHRP (common hardware reference platform) version of the Mac OS, even though about 75 percent of those enquiring so far want to buy motherboards.

While these systems can also run NT and AIX, Nutt says PowerPC developers don't need Yellowknife to develop a Windows NT solution. They only need it if they want a system that can run NT (for as long as Motorola continues to support the current version of NT on PowerPC) and the Mac OS interchangeably. He also says that neither Mac software developers nor PowerPC Windows NT developers will have to rewrite their code to run on Yellowknife systems.

In addition, he expects that the latest hardware technologies such as the universal serial bus (USB) and FireWire technology will be used by developers creating systems using Yellowknife, although neither will be required as part of the minimum mandatory hardware specification in the initial implementation of the reference design.

This discussion followed the announcement in October by IBM and Motorola of enhanced versions of the PowerPC 603e microprocessor, including a 240 MHz version (which has since been overshadowed by more recent 300 Mhz PowerPC announcements).

Is it enough?

The real question is whether all this effort is simply too little, too late. Whatever the attractions of providing the chips to drive high-performance Macintosh workstations (as well as a number of single-purpose devices), the volumes of this business pale in comparison to what Intel has been able to achieve with its Pentium-class processors and beyond.

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consortium was to provide an alternative to the Intel chip monopoly The idea was that with chips capable of running the Mac OS, IBM's OS/2, Unix and Windows NT, there would be a compelling reason for system builders to look at PowerPC as an alternative.

While Apple has put the most energy into making PowerPC its mainstream platform IBM's efforts to have OS/2 on the PowerPC were slow to start and underwhelming at best Meanwhile, Windows NT implementations on PowerPC have suffered from the lack of native 32-bit NT applications converted to run on PowerPC, effectively destroying any chances of NT-based PowerPC systems being considered as high volume Intel alternatives.

The NeXT challenge

The major problem facing the PowerPC players now is a growing perception that they have missed the boat In its current form, PowerPC will never be anything more than a niche player in the PC processor world Moreover, recent developments at Apple may soon see its dominance in the Macintosh market slip away

The problem lies with the NeXT operating system, which is being blended with Apple's existing PowerPC Macintosh operating system in a planned upcoming OS release called Rhapsody This newly hatched plan is one of many announced in the wake of the Steve Jobs deal with Apple It is hard not to consider the fact that NeXT did not have a version of its operating system capable of running on the PowerPC and that some Rhapsody developers may initially start working with NeXT software on Intel PCs before it ever gets to the Mac

If Apple runs into a lot of problems in porting Rhapsody to PowerPC (which would certainly be the Apple way, given all the trouble in other recent attempts to get new and improved operating systems to market), it is likely that developers could be pointed to the current Intel version of NeXT as a way to get working with the code There have even been suggestions that Apple might have to migrate its hardware base to Intel if NeXT on PowerPC proved highly problematic

Apple's official line is that Rhapsody will be based on the merging of technologies from Apple and NeXT and that it aims to "provide strong backward compatibility for Mac OS software offering current customers a smooth migration path" to the new OS

Through this approach Apple expects to provide customers and developers with a platform for "exceptional and cutting-edge applications" while "enhancing" their current investment in the Mac OS. Apple also claims that what it calls "the advanced technical underpinnings and rapid development environment" of Rhapsody will allow developers to create new applications that leap frog those of other "modern" operating systems, such as Windows NT

Apple says the first release of Rhapsody to developers will be in mid to late 1997 and delivery to customers will be within 12 months Apple plans to incorporate features such as pre-emptive multitasking and protected memory, as well as a modern kernel It is expected to also include a new application programming interface (API) based on NeXT Software's OPENSTEP environment In parallel, Apple also promised that the Mac OS continues to evolve with a significant upgrade Mac OS 7.6, announced in January

If the whole idea seems a little odd the company suggests that it is, in many ways, no different than Microsoft's two-track strategy for Windows NT and Windows 3 1/95 While it was enhancing DOS and Windows throughout the first half of the 1990s, it was also developing and then updating new releases of Windows NT to the point where Windows 95 and Windows NT will eventually merge Apple wants its strategy to be seen in the same way

Apple claims that this strategy will allow both Mac OS and Rhapsody to share a similar look and feel and provide compatibility with existing Mac OS applications and hardware supposedly giving customers and software developers a smooth upgrade path to next generation technology The company further pledges that existing Mac OS software should work within Rhapsody at PowerPC speeds Additionally Apple says it plans to make Rhapsody able to support today's currently shipping Mac OS computers as well as future Mac OS hardware

The important issue for the PowerPC group is Apple's pledge that both the new versions of Mac OS and Rhapsody will be optimized for PowerPC hardware Rhapsody is expected to support all currently shipping PowerPC-based systems sold by Apple and Apple licencees today Rhapsody is also expected to support all upcoming products including the PowerPC Platform (i e all the CHRP products) Apple says it also intends to continue to develop, sell and support NeXT software products for other platforms such as Pentium Sparc and Windows NT

Continued on page 96

Share files with your Macintosh buddies

Translation software helps bridge the PC-Mac gap

BY ROSS MACDONALD

Despite the inherent paradox, as computers have become more and more sophisticated the rift between the PC and Macintosh worlds has become increasingly more frustrating. An increasing number of individuals use their computers for just about all the tasks a computer can do. Rapidly fading is the writer-only, bookkeeper-only, illustrator-only or designer-only. Many an entrepreneur now sits alone in the basement trying to incorporate all those necessaries into an independent presentation, proposal, brochure or flyer—and often at 3 a.m.!

Of course, as the self-employed have increased in numbers there's been lots of job sharing too, as writers, artists, budgetary types and designers pool their resources toward a common end. Equally, there are several sectors of the economy that rely heavily on the Macintosh—education, graphics arts, and publishing, for example—which we're likely to occasionally bump into in the course of our PC computing efforts.

Which is the where the rift between PC and Mac becomes particularly salient. Sure, some individuals are prosperous enough to purchase both a Mac and a PC but, more often than not, such is not the case. A writer may use MS Word for Windows and be trying to coordinate with an artist using PageMaker on a Mac. An accountant may work on a PC notebook and try to share files with a designer who works on an Apple. And when that whole team gets together—and anyone who's ➤

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ever tried this will knee-jerk in agreement—all kinds of logistical hell break loose

Even where the software makes claims to be able to convert between platforms, those claims generally apply to simpler files with results that are often less than convenient as formatting, graphics or special layout commands get lost or jumbled in translation

And this is where software to bridge the rift between PC and Mac comes in In the face of Apple's exclusivity several developers have come up with software packages that actually and accurately translate data between the two computer worlds.

Now Apple has the advantage here because you can actually purchase a PC card for mounting inside the Macintosh that contains what amounts to an entire PC—it even has a CPU on it. This hardware makes Macs completely PC compatible and allows them to actually operate as a PC

Apple users also have access to the SoftWindows program—licensed source code from Microsoft that turns any Macintosh into the essential equivalent of a 486 PC. It's not as fast as the PC card though because it faces limitations as software that hardware just isn't bound by But it's still a viable alternative for Mac owners who want full access to the PC world. And, let's not forget, any modern Mac will read PC-formatted diskettes automatically

Alas, going in the other direction proves far more problematic. The various reasons for this are explained by Phil Day of Byte Computers, a long-standing Apple retailer in Vancouver, B C "The Mac operating system is a copyrighted system and, on the Macs, anywhere from 4 MB to 8 MB of the operating system is encoded into ROM This offers a ridiculously fast access time as well as making it almost impossible to corrupt

"And Apple will basically sue the gills off of anyone who infringes on their copyright Apple will license—and has only been licensing—that ROM (which is basically their OS) to companies like UMAX Motorola Tatung Siemens, IBM and several others—but the computers that are now licensed to run the OS are all PowerPC-based machines And Apple still refuses to license just their operating system those companies who are now licensed are licensed to build Mac clones," Day says

The only way you can get a Mac program to run on a PC according to Day, "is by two rather convoluted routes One is to run UNIX on the PC—and of course there's a hundred types of UNIX—then you can run something that Apple sells called MACE, which is the Apple operating system for UNIX It allows you to run Mac programs in UNIX but from inside a window—you're not replicating a Mac environment, it just allows you to run Mac programs."

Getting a Mac program to run on a Windows or DOS machine is another thing According to Day, the only way is to find an old Mac that's been damaged or junked and wire up a circuit board that would interface over to the DOS world.

"There is one company that has succeeded in doing so through reverse engineering," Day concludes, "but their compatibility list stands at about only 20 programs and even

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Those are apparently highly flaky. And it only runs the old System 6 operating system, which would be like running your PC on DOS 2. In short, this board is more of a design curiosity than anything else. Someone has gone to the trouble to reverse engineer the Mac operating system to run programs from around 1988 and 1989!"

Enter data converters

In short, you might as well live with the fact that you'll never get full Mac compatibility from your PC. However, the Mac conversion software packages that are available to PC users pose a somewhat attractive compromise in being able to fully convert "data" generated by Mac programs into a format fully recognized by your PC.

And depending on which conversion package you get, you'll be able to convert, load, read, and change anything on any Macintosh file generated by any of the more mainstream programs—word processors, graphics, databases or spreadsheets—then save it to your PC just as if your machine created it. Or you can reverse the process and send the new or altered file back to the Mac.

As these programs have gotten more sophisticated, it is also now possible to access Macintosh formatted non-floppy diskette removable media like cartridge drives, Bernoulli drives, and PD disks. You can even run Mac CD-ROMs and see all the video and animation as though they were PC discs, because we're still dealing only with data. The majority of the PC world uses the Apple video format called QuickTime anyway, simply a version tailored to Windows.

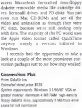
I recently had the opportunity to take a look at a couple of the more prominent conversion packages just to see how they worked.

Conversions Plus

From: DataViz Inc.

Estimated street price: $125

System requirements: Windows 3.1/95/NT, VGA or greater monitor, minimum 4 MB RAM, high-density floppy diskette drive, approximately 8 MB hard-drive space for full installation



This tidy little package makes just about all things possible when it comes to swapping files between PC and Mac or simply viewing data (as in the case of CD-ROMs). Specifically, it contains translators for 15 brands of PC and nine brands of Mac word processors (plus various versions of each), seven PC and three Mac spreadsheets (various versions additional again), five PC and three Mac databases (don't forget those various versions), nine general ➤

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graphics formats (i e , non application specific) and font binary transfers All these translators both read and write the specific files they're designed for as well as identifying all the text formatting and control information necessary to make a Mac file look and run right on your PC—or your PC file look and run right on somebody else's Macintosh

Setting up in Windows 95 was quick and easy and the six floppies looked for only about 8 MB of hard drive space for a full installation DataViz kindly provided a disk of sample Mac files to play with too—which I did Once launched from the Programs menu, Conversions Plus presents you with a familiar looking window from which to choose the source drive directory, and file on the left hand side and likewise a destination on the right

So for example, if someone hands you a Macintosh floppy you simply put it in your "A" drive, choose "A" drive on the left, and click the file you want when a list appears. You then select which drive and directory you want the converted file to show up in on the right hand side of the screen Likewise, you can send a file back to the floppy, or whatever Mac formatted media you want, and it will be fully converted for use by that alien machine

Simply click the "Copy and Convert" button and... Presto! seconds later the job is done. All that remains is to go to your destination directory and open the file.

I tried it using both text and graphics files from the DataViz Macintosh sample disk and sent the files into MS Works which happily opened both types with reassuring alacrity Convenient options include a graphics file previewer so you can see what you're going to translate before doing so as well as a button for getting more information about a file before making any crucial decisions.

Though I didn't have any to test, this process is touted as equally straightforward when dealing with Mac formatted SCSI media like removable cartridge drives and even Macintosh hard drives—which means you can install a Mac hard drive in your PC if you have that much need All SCSI devices that are controlled by ASPI for Windows compliant drivers are supported In fact the only direct caveat I could find for the whole package is that Conversions Plus specifically does *not* support double-density Macintosh floppies

With its economical price ease of use, and seductive efficiency, Conversions Plus makes for an excellent link to the Macintosh world

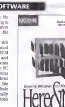
Here & Now

From Software Architects

Estimated street price: $95

System requirements: 286 IBM PC (386 or higher recommended) 640KB RAM (4 MB or more recommended), 3.5-inch floppy drive, DOS 3.3 or higher Windows 3.1 or higher (optional if DOS support only is required) 512KB conventional memory under DOS and Windows 3.1 (required) approximately 1.5 MB of hard-drive space for a full installation.

Here & Now allows a relatively seamless and transparent exchange of files between PC and Mac, though its interface isn't nearly as intuitive as what we've become used to. Instead of an actual window to direct us through our file conversions, in the Windows 95 environment Here & Now wants us to address the source drive directory, and file we want through the My Computer window You then double click your file choose the application you want it to appear in and ostensibly it will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Here & Now includes translators for a total of 39 applications (including various versions of each) though some of them will work in only one direction (i.e transfer from Mac to PC only or vice versa only) On a happier note, Here & Now supports all the usual media as long as the appropriate ASPI manager is present for SCSI devices (cartridge drives, hard drives, PD drives, CD-ROM drives, etc.).

Installation from the single floppy was easy and fast though it stops in the middle of the process to ask if you're going to be addressing any SCSI devices. If so you're told the ASPI manager must already be installed, then you're directed to select "Extended" instead of "Floppy" before continuing Once done, a Read Me file shows up which amounts to little more than encouragement to register and an ad for another Software Architects product called DOS Mounter 95—a package similar to Here & Now except made for those working primarily in the Macintosh environment.

I must admit however to having had only partial success using Here & Now managing to convert only specific text files and none of the graphics files from my DataViz sample Macintosh disk. It is likely, however, that this is because my test machine did not have many of the applications installed that Here & Now specifically looks for For example Here & Now is happiest converting a Mac file made in say, PhotoShop into a PC file for the PC version of PhotoShop Even Software Architects' own promotional literature says, "Automatic linking of Mac files to APPROPRIATE PC applications.. "

Overall, Here & Now is likely a practical package but more for those PC users who are forward thinking enough to already know what type of Macintosh contact they'll be requiring And, with its minimal system requirements and modest use of system resources while still workable in both DOS-only and Windows environments, Here & Now will be very attractive to those who are resentful of PC software's continued insistence on Windows. ❑

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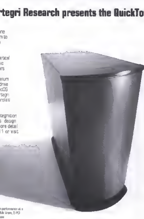
Vertegri Research's history as a system integration company is evident throughout the company's design marketing manufacturing and tech-support. For more detail on Canada's first Mac clone call 1 800 622 9611 or visit WWW paulgossen com



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Powered by a 200MHz 604e processor the E^2 basebox offers workstation performance at a entry level price. The basebox features 16Mb Ram 1.6Gb IDE drive 2Mb Vram, 5 PCI slots, 4x CD-Rom drive System 7.5.3 CD ergonomic ext keyboard & mouse

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There is always something for everyone in a general-purpose reference and encyclopedias also serve as an invaluable project and homework tool for school-age children

IBM was certainly not the first to come out with an encyclopedia but when it did, it chose to team up with World Book to take advantage of the latter's 80-year history in print. One of the admirable features of both the book-based *World Book Encyclopedia* and the CD-ROMs in this review is that they gear topics to school curriculum Thus, students researching a given topic will find text, graphics animation sequences, maps and video clips appropriate to his or her grade level

It is very important that the subject be presented in a way that is most useful to the student—i.e. not be too incomprehensible nor too simple Thus when you research popular topics such as dinosaurs and whales with this encyclopedia, the material is presented in a context that younger students are able to understand.

For general research the encyclopedia features a topic search that finds the most relevant information It will also allow searches by word or a combination of words Included is a 225 000 word dictionary, so there is a good chance you will find the subject or topic you are looking for Unlike some other disc-based encyclopedias World Book includes an atlas Through the use of color overlays the maps reveal the physical, political, and population elements of any country

There are a few other features not found in competing products a highlighter, sticky notes outline and time-frame search The highlighter works in the same way as the pen one you would use on paper. It highlights passages for your own reference Likewise sticky notes are the same as the ones you can find in the real world You can leave them on the "pages" as personal reminders and leave notes in the text area The only thing you cannot do is keep track of where they all are for easier retrieval—like bookmarks

If you have waited forever while the computer retrieved volumes on a subject (when all you needed were the basics) then you will love the outline feature It presents a brief outline that you can quickly navigate without getting bogged down from subject to subject You can also include a time reference with your search breaking it down to the year, decade century millennium or period in time (e g the Crusades) Multiple windows in the outline search allow you to see what else was happening in the same time period as the event you happen to be looking at

As is the norm these days this encyclopedia has online links for many of the subjects you are researching You can also go online and link to a database and online library that feature special articles for downloading The initial 12 month access is free

The visuals are very good with very quick 3D and virtual reality modules built in. I suspect it is because the program loads on QuickTime 32 during setup It is certainly quicker than the competition

For parents wanting an encyclopedia for the home that ties in nicely with the school curriculum the World Book Multimedia Encyclopedia would be at the top of the class. ❑

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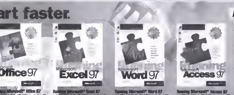
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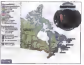
Unique content spices up Canadian geography CD-ROM

BY JEAN ALLEN-IKESON

Canadian Geographic Explorer a new disc from Toronto's IQ Media has a list of features sure to interest us Canucks. It's all Canadian, backed by *Canadian Geographic Magazine*, and contains the official *Canadian Atlas* (whose contents have never previously been released by Natural Resources Canada)

On the whole, it will have Canadian schools and libraries genuflecting in appreciation The home edition has been available since Christmas, but a school version with lesson plans and course curriculum will arrive sometime this month According to a company spokesperson, "IQ is working in cooperation with nine members of the Canada Council for Geographic Education at both the elementary and secondary level to produce a guide with lesson plans activity cards, and a student-friendly manual to accompany the Explorer CD-ROM Dick Mansfield from Queen's University is an adviser to the committee."

Canadian Geographic Explorer
From IQ Media
Price $64.95



This disc contains a little something for every taste: satellite imagery with simulated fly-bys over four locations atlas data from 10 thematic categories and reprints of *Canadian Geographic Magazine* for more depth a map maker with a large number of overlays from beaver population spots to likeliest earthquake locations to regions of modern or ancient native language use, and—of course—a quiz.

The fly-bys are short but are a good use of this modern technology They are narrated by Canadian astronauts—a great way to slip a few role models into geography The software also includes 3D glasses to view examples of "chromostereoscopy," which is a technique developed by the Canada Centre for Remote Sensing and combines aerial photos and high-resolution digital elevation information

Students will enjoy using the map maker to spice up school projects. (For high-end map creation, a more expensive professional product called ArcView is available from ESMI) IQ's map maker has cultural physical geological or hydrological base maps for Canada Forty six additional overlays on wildlife parks, transportation, cities, population, weather language, ecology, etc should be a boon for school projects.

The only drawback is that the print-outs are grainy and there is no choice of printer features such as printer selection or resolution to improve the output. You are able however, to add a title and the legends are well-organized it can add an impressive touch to school assignments since maps can be customized with information for a particular project.

A special section called "compareography" comes from the official *Canadian Atlas* It contains 10 thematic categories from water ways to wetlands to business and industry This section shines because its origin is *the* Canadian resource, Natural Resources

Continued on page 96

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Canadian geography CD-ROM

Continued from page ***94***

Canada, which has spent years developing maps and an archival database of place names, waterway routes, political boundaries, historic facts, and a wealth of other information about Canada.

For dessert, *Canadian Geographic Magazine* articles and National Film Board video clips are linked to areas of interest on the maps. This spring, a Web site with more information that may be downloaded in the form of new maps, satellite images astronaut information, and trips across Canada will be available It will be called the Explorer Club At about the same time a French-language version will be released

A final feature is included for those who want to do just a little more the software included with Explorer for PCI Image Handler, PCI Fly, and RADARSAT gives you the tools to manage remotely sensed imagery and aerial photos with the potential for conducting customized, detailed studies

I went over the disc with Carol Cassidy the head of the geography program at the high school (Hillfield-Strathallan College) that my son attends "It is great to have such a software package reasonably priced with such depth of detail and accuracy about Canada Parts of it can serve as a starting point for geographic inquiry, while other parts of the software provide geographic data and answers to inquiry I would definitely like to use this title with my Canadian geography students. and house a copy in the library" ☐

Contact: IR Media Tel: 800-287-0824
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PowerPC

Continued from page ***86***

So what does it all mean?
The likely future for PowerPC is that it will continue to be a key part of Apple's medium-term plans for the Macintosh platform but there are indications that Motorola understands this may not necessarily be the case over the longer term. Apple vice-president Ellen Hancock has made clear her intention to make the company into much more of a software organization (shades of NeXT!) It is therefore not unreasonable to think that it would look to broaden support for more hardware platforms, especially as NeXT already brings that expertise to Apple

For this reason and others, you can expect to see the PowerPC processor increasingly being offered as a computing engine to drive peripherals, special purpose devices (such as network computer-style Internet access terminals), and even handheld computers (some of which may run the Windows CE operating system)

It is worth noting that all the key PowerPC signatories were also very high-profile backers of the whole network computer concept and that both Apple and IBM have already developed products (in the IBM Network Computer and the Apple-developed Pippin) that broadly execute the NC idea ☐

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CD REVIEW

Corel's amputee CD-ROM

New disc a must have for amputees and their medical professionals

BY IAN GREGSON

Corel Medical Series The Amputee
From Corel Corp
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There has been an ongoing movement within the computer world to develop medical self-help programs be it on CD ROM or on the Internet Discs such as The Family Doctor by Creative Multimedia, or the Mayo Clinic Family Health have been general in nature But now, taking medical self help one step further is Ottawa-based Corel Corporation with its Medical Series The first releases include CD-ROMs on Epilepsy Child Care and the subject of this review, The Amputee

Written by an Ottawa doctor, J.P Desjardins (whose honorifics include Fellow of the Royal College of Surgeons in addition to his MD status), assisted by two certified prosthetists Craig and Sam Smith, the Amputee CD-ROM boldly goes where no disc has gone before

The Corel and Desjardins team has to be congratulated for putting together what cannot be a very financially viable project, given the size of the potential audience (compared to the general computer user population)

Physiotherapists prosthetists, physical therapists, occupational therapists and medical students alike will all find this CD ROM

Continued on page **102**

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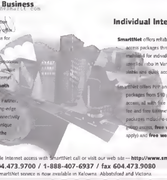

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Weaving Your Own Web Site, Part XVIII

Style Sheets - Part I

BY KEITH SCHENGILI ROBERTS

Until recently it has not been possible to add a lot of formatting information in hypertext markup language (HTML) pages. Some very basic layout tags have always been available, but HTML was not designed with extensive formatting rules in mind, but instead it inherited the idea that text layout should follow a logical structure, rather than a typographic layout. This was a way of ensuring that the Web could be used across many different computing platforms, and by many different browsers.

But Web authors have never been completely happy with this structure, as it does not allow for the full range of stylistic expression possible in desktop publishing environments, or even that found in any word processing application. Even where style isn't considered important, many Web authors have been frustrated by the limitations HTML has imposed on where they can place the various elements on a Web page.

That is why one of the more impotrant potential developments in the ever-changing world of HTML standards is the introduction of style sheets. Style sheets accomplish many things within the world of regular HTML, such as controlling the presentation of fonts, colors and spacing elements on a Web page. Style sheets finally offer HTML designers the opportunity to do real layout with HTML.

While the concept of style sheets is relatively new to the Web, it has been used for years in desktop publishing programs. Style sheets are often used to create a specific "look" for a type of document. It can be used as a formatting template to create typographical styles specific to a publication, or it can be applied as a set of stylistic rules used to format a document to a standard form, like a memo or a standard business letter.

The World Wide Web Consortium (W3C) recently adopted the cascading style sheet (CSS) format. It is relatively easy to understand and implement within existing Web documents, and describes document styles in terms anyone familiar with desktop publishing programs will instantly recognize. As yet, CSS is only implemented by a few Web browsers—including Microsoft's Internet Explorer—but if widely adopted it will open up the possibilities for doing proper layout with HTML.

The basics

CSS is designed to bridge the gap between Web authors who want to add more stylistic and formatting elements to their Web pages while retaining the flexibility of the HTML language for use across various computing platforms. With CSS it is possible to create a Web page that can be read by a browser that adheres strictly to the HTML 2.0 specification, while adding stylistic and formatting elements for Web browsers capable of handling style sheets. With CSS, HTML authors are able to do the following:

- add tabbed indentations,
- specify font point sizes directly
- set explicit margins within a Web page
- set formatting styles for single or multiple Web pages
- define different types of formatting styles ("classes") for the same elements, enabling the user to define such things as paragraph styles (like indented, dou-

Continued on page **101**

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Weaving your own web site

Continued from page **99**

ble spaced or normal)

- and reduce or eliminate a large amount of tags normally needed for specific features (like <FONT SIZE>) using their beginning and end tags making the HTML on a Web page easier to read and edit later

It is very easy to add style sheet information to a Web page. The following is an example of a Web page containing a very simple style sheet that formats all instances of level-1 headers to the color green

```
<HTML>
<HEAD>
<STYLE>H1 {color  green}</STYLE>
</HEAD>
<BODY>
<H1>Green Header</H1>
</BODY>
</HTML>
```

If you view this code in Internet Explorer, you will get exactly what it describes. a Web page with a green level-1 header containing the text "Green Header" This is a very simple example of a CSS "rule" A rule consists of two parts: the selector (in this case "<H1>"), and a declaration of the property and value applied to the selector ("color: green") In this case, the style sheet information was contained within the <STYLE> tag, (a simple container tag that has both a beginning and an end tag) placed in the header of a Web page

Another innovative change to the way tags can be manipulated within the CSS scheme is the ability to add additional information to an existing tag within the body of a Web page This enables Web designers to change a single tag, a group of tags or a large block of data on a page For example the following code can be added to a single level 1 header to change its display properties so that it behaves in exactly the same manner as described in the previous example

```
<H1 STYLE="color  green">Green
Header</H1>
```

This tag incorporates the "STYLE" attribute an attribute that all HTML tags can take under the CSS definition

Some readers will look at the second example and realize that there is the potential for conflict between the two styles of tags For example what would happen if you insert an inline style sheet element (the latter green level 1 header example) within a Web page that has already defined how that particular tag should be displayed (say, that level 1 headers should be displayed in blue instead)?

Resolving conflicting CSS rules is fundamental to the CSS specification, in fact this is the "cascading" part of the CSS scheme This cascading order can be defined by three basic rules:

1. A general formatting rule applies globally to a document (this is no different than typical HTML usage)
2. General formatting rules are overridden by specific inline rules within the document.
3. If two or more elements are specified that have the same "weight" the latter referenced is applied

In simpler terms specific rules tend to override global ones This can be seen in the following HTML code which contains three different level 1 headers

```
<HTML>
<HEAD>
<STYLE>
H1 {color  blue}
</STYLE>
</HEAD>
<BODY>
<H1>Blue Header</H1>
<H1 STYLE="color  green">Green
Header</H1>
<H1>This is a regular header</H1>
</BODY>
</HTML>
```

If you view this code in Internet Explorer you will find that the second level-1 header is displayed in green while the first and third headers are displayed in blue The first header inherits the style sheet attribution "blue" This attribution is specifically overridden in the second green header, but is restored by the third header ❑

Next time. Cascading Style Sheets—Part II

Keith Schengili-Roberts welcomes any comments suggestions or HTML tips and tricks you may have You can email him at kschengi@interlog com His book on HTML, The Advanced HTML Companion *(ISBN 0-12 623540-6) is available in bookstores Previous articles in the series can be found at* The Computer Paper *Web site at http //tcp ca/*

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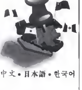

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Corel's amputee CD ROM

*Continued from page **98***

as essential as any textbook on human anatomy. Likewise, amputees will benefit greatly from this disc especially new amputees and family members.

The authors have compiled the sum of their knowledge into a user friendly and intuitive format that is easy to browse and keep track of. There are numerous QuickTime movies and animation clips for all levels of prosthetic device and amputation. Also included is a review of current technologies ranging from the SACH foot to the Flex Foot VSP and the UTAH arm. There are photos of various types cancers and of traumatic amputations. Surgical techniques are also explained.

The Corel and Desjardins team has to be congratulated for putting together what cannot be a very financially viable project, given the size of the potential audience

It is somewhat difficult to criticize such a CD-ROM as it has no predecessor for comparison. However, there are some limitations to the content of the disc. Multiple levels of amputation are not explored and there is no discussion of prosthetic alternatives, such as crutches and the use of wheelchairs, or the use of no prosthesis for arm amputees. Support groups are only mentioned in passing with no addresses or online contacts given out. The QuickTime movies featuring amputees are set in the prosthetic lab, not on the street or in daily activities.

Given its few shortcomings this CD-ROM is an excellent first step into the realm of specific medical support for specific medical conditions. I highly recommend this disc for amputees of all ages and experience.

Look out for more amputee-oriented CD-ROMs from other companies in the very near future.

The Amputee is a hybrid CD-ROM. It runs on both Mac OS and Windows 3.1/95. Corel recommends a minimum of System 7.1 and a 68030 processor for the Mac and a 486 DX66 for the Windows environment. ❑

Contact: Corel Tel 800-772-6735

Ian Gregson is moderator of the Amputee & D-Sport Listserv and can be reached via email at igregson@portal.ca. For more information check out the Amputee Home Page http://www.portal.ca/~igregson/index.html

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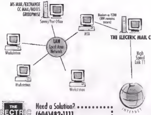

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Stimulating, simulated flights of fancy

BY ROD LAMIRAND

Flight Simulator for Windows 95
From: Microsoft Canada Inc
Suggested retail price: $79 95

Over Chicago in a Cessna 182RG It was easy. You couldn't get lost because of the great big high rises in the middle of the city—go around those once and the landing strip was right there!

But here over Seattle in a Learjet 35A, coming in for the fourth time, trying to line up the airport without understanding the navigation system, it's impossible. The best I can do is hit the grass along the edge of the runway at an angle and hope to stop before we hit the suburbs of the emerald city. Straddling the dangers of a crash and a stall, I watch very closely as the ground comes up to meet us.

I study the altimeter wishing I had checked the elevation of the airport before taking off. With flaps down and throttle back I skip hard twice, than level out and am on the ground. Whew!

But wait. I am careening along grass at a couple of hundred miles an hour! The brakes, done. Kill the engines, done. Looks good but all of a sudden I am again in flight, momentarily, flaps are down, engines idling, or in reverse, I don't know, power up, pull up the nose!! But—CRASH!

In the instant replay, watching from a spotter plane, I see what has happened. I have gone over a 20 or 30 metre drop off at the end of the field. Without any lift, my nose has gone straight down, game over. Lesson number six, land on the runway!

Microsoft has finally rewritten its very popular program Flight Simulator, for the Windows 95 operating system. The earlier version of the program would often work on the new operating system, but as often not, as judged by the frequent problems users posted in newsgroups across the Internet and on the Microsoft Network.

I myself found the previous copy impossible to run on a particular Pentium 120 regardless of the time and effort spent. So it was with great pleasure that I received the new release and found it loaded without a hitch on three different machines, including the Pentium 120 that had earlier proved unworkable. (Using the software on multiple machines is copyright infringement and was only performed here as test of the install procedures and performance variance.)

Not content to do anything less than our readers deserve and having the benefit of a father-in-law who is a corporate jet pilot, I determined to give the program the ultimate test: a real pilot. Capt. William Quakenbush routinely flies his company's jets to every corner of the continent but, more importantly, has spent untold hours in multi million dollar professional flight simulators. Stay onboard and I will give you his reaction to the program.

Flight Simulator for Windows 95 is a CD-ROM-based program that requires Windows 95 and a multimedia PC. The box claims that a 486DX-66 with 8 MB of RAM is all that is required and that is true, if you run everything at its minimum. For example, the dynamic weather would have to be turned off and the level of scenery detail minimized. The resolution of the view area might have to be cut back especially if you were using a video card with only 1 MB of memory. Even then performance would not be pleasing. The box recommends a Pentium with 8 MB of RAM, which is better, but the truth is a minimum of a Pentium 120 with 16 MB of RAM and a good graphics card is needed to experience all the program has to offer.

Once you get the thing up and running, this reviewer (an old hand at software but a member of the uninitiated in the experience of flying) finds the program excellent. The level of complexity is amazing. Pilots can fly out of numerous airports all over the world, and choose from six airplanes—from a Boeing 737 400 to a Sopwith Camel.

Time of day and season are excellent variables, but don't even try to land the jet in the dark, in the rain! There is a flight instructor to give you lessons if you like, but be careful: if you foul up he says, "I'm outta here," and disappears. The realism of the program, which has always been great in earlier releases, is improved with greater

Continued on page **109**

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Creating an electronic presence: Part I

BY KEITH SCHENGILI-ROBERTS

You have decided that you want to create an "electronic presence" for yourself or your firm on the Web Whether you simply want to put up a personal home page or construct a large business Web site many of the fundamentals of establishing an electronic presence are the same What sort of "image do you intend to project? What type of Internet service do you choose? What software tools should you get? All of these questions and more need to be considered when you are thinking about creating a presence for yourself on the Web This article is intended as a brief guide to the things that will help you make up your mind about how to get yourself on the Web

To be, or not to be?

Perhaps the biggest question is. Why do it at all? That may seem like a flippant question to ask, but it isn't really If you are an individual, there are few compelling reasons to make a personal Web page The first Web pages developed when the Internet was primarily for academics, tended to consist of nothing more than a resume or curriculum vitae perhaps accompanied by a picture These days it seems like just about everyone has a Web page and there is a Web page on every conceivable—and seemingly inconceivable—subject But even this is not reason enough to create your own Web page What do you expect to get out of creating your own Web page?

If you are a company planning to go online, the reasons are more clear cut. The Web is one of the cheapest ways of reaching a worldwide audience You are virtually guaranteed that the visitors who come to your site are interested in what you have to

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offer. Unlike television, everybody who drives the information highway has their hands on the steering wheel. If a person arrives at your Web page, it's because he or she wants to be there. Even if your firm doesn't intend to sell much or anything at all online, the Web has become a great promotional tool. Large companies like Nike and Saturn have recognized the fact that the Web is a great place to distribute information about themselves and their products.

There seem to be three primary reasons why people want a personal Web site: to learn hypertext markup language (HTML), as a method of self-expression, or a combination of the two.

Learning HTML is a highly laudable goal these days, as it is rapidly becoming a valued skill to have in the business world. Soon after people began creating their own Web pages, it rapidly became a medium for self-expression. Even if it is yet another *Star Trek* or *X Files* fan page, a page devoted to your favorite hobby, or a forum for your thoughts and opinions, the Web has become a way for people to communicate with others of the same interests.

A Web page can also be a great tool for self-promotion. A case in point: I was recently hired for a job after a corporate "head hunter" found my Web page. The head hunter did a simple keyword search on a Web search engine for technical writers in the Toronto area. My name (and Web page) came out of that search. Since then I have helped in the hiring process of somebody else involved with graphic design—the thing that clinched the contract was the fact that the winning designer had a Web site that visibly displayed his talents. While these examples may seem extremely fortuitous, they do help illustrate the possibilities that are opened up by promoting yourself on the Web.

Of course, there are no guarantees that your Web page will draw interested visitors or, if you are a firm, any tangible benefits. In choosing to create an electronic presence, you'll also have to consider the time you'll need to spend learning enough to get your Web page established, and the costs involved.

The costs

To get on the Web, you have one of three options: sign up with an Internet service provider (ISP) and create your own Web page, set up your own Internet server, or hire somebody else to do it all for you. Most individuals quickly develop a do-it-yourself attitude towards creating Web pages, and that's what we'll explore here.

Some people sign up with an ISP, often only with the intent of using email, and then discover they have access to the World Wide Web. Since the majority of ISPs now offer some free space on their Web server for every client, it is an extra incentive for putting up a personal Web page. If you do not know enough HTML to put up a Web page immediately, check out the large number of online resources devoted to the subject. If you don't know where to start, go to a search engine like Yahoo (see contacts) and do a search on the keyword HTML. You will find dozens of Web sites devoted to teaching the basics of HTML.

If you are interested in a book on the subject, go along to any bookstore and look for the computer section. It is virtually guaranteed that you will find multiple books on the subject. In terms of book buying, expect to buy at least two books: one that will give you enough to get started, and another, more advanced book that will serve as a handy reference. Don't feel you have to get them both at once.

Once you have a Web page constructed on your computer, you have to be able to transfer it to your ISP. Most ISPs provide information on how to upload your Web pages to their server. The most common way is using the file transfer protocol (FTP) to send your files to the Web server, though some ISPs allow you to transfer your Web pages to them via a direct dial-up access. Some will even gladly take a diskette you hand them and place the files on their Web server for you. Check with your ISP's Web site for this information, or call their customer support line if you feel like you need to be talked through the process.

Keep in mind that you may incur additional charges for your Web site. Take the case of an associate of mine who created a Web site that became popular overnight. This was a great ego booster for him, but at the end of the month, he got a huge bill from his ISP. It turns out that he was being charged for something he had no direct control over—the total amount of downloads from his Web site. His site made use of a lot of large pictures and most visitors to his site downloaded all of the text and pictures to their own systems. He had been allotted 100 MB of free downloads from visitors by his ISP, but was charged per MB for everything above that amount. Luckily he ➤

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was able to work out something with his ISP regarding his site and he immediately reduced the graphic content of his Web site, but it pays to check with your ISP if there are any hidden charges when you create a Web site. Never take anything on the Web for granted.

Choosing an ISP

It may seem odd to talk about getting onto an ISP at such a late point in the article, but if you are not with an ISP, having read this far you now have an idea of what features to look for.

Probably the best way of getting a feel for what makes an ISP good or bad is to ask any friends you have who are already "connected." Chances are you will hear an equal share of horror stories and hearty recommendations.

Ask your friends whether they have had any trouble connecting to the ISP when they wanted to, how good their technical support is, and the ease of use. Do they feel they are getting their money's worth out of the service and if not, why not? If you do not know anybody who is already on the Net, check out the local newspapers (or the ISP list in the February issue of *The Computer Paper*) for ISP advertisements. Compare the features, benefits and costs of each and then call the ones you think offer what you want for more information.

If you are able to get through and get sensible answers to your questions, you are doing well. Before subscribing to several months' worth of service, find out if there is an introductory rate. If you are not satisfied with an ISP's services, this gives you the chance to bow out gracefully sooner rather than later. If you are satisfied, nothing is lost and you also gained the opportunity to assess whether the type of Internet services you thought you needed are adequate. ❑

Next time. Getting the tools to create your Web site

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NC vs Windows 95 cost-of-ownership

Researchers find savings in NCs and better PC administration

BY JACQUELINE EMIGH

STAMFORD, Conn (NB)—Gartner Group analysts released research indicating that products in the emerging category of network computers (NCs) can save companies 25 percent or more over Windows 95 desktops, but that organizations can also achieve substantial cost savings through improved administration of full-fledged PCs

Gartner's newly released total cost of ownership (TCOs) study for NCs evolved from earlier TCOs research developed by the firm, according to Gartner analysts Dave Cappio and Bill Kerwin during a teleconference in January

For the TCO study for NCs the two analysts projected the savings using three NC models and four different cost-of-ownership factors

Leading the way with 39 percent in savings is the NC-C model, a Java-type thin-client workstation, like those being created by Sun and IBM

In the second slot with 31 percent is the NC-S model a "Windows imitator" in the same category as Winterm NCs.

In third place, but still resulting in a 26 percent cost reduction, is the NetPC, Intel and Microsoft's "fatter" client.

Gartner found the annual total cost of ownership per user for a Windows 95-based PC to be US$9 784 and US$10 917 for its Windows 3 1 based equivalent The annual total cost of ownership for the NC-C NC-S and NetPC models were projected to be $6,110 $6 775, and $7,267 respectively

Kerwin says however that companies can also realize savings of about 25 percent through better systems management of Windows 95 environments. Cappio also cautioned that Winterm's NC-S-type model is the only NC available at this point and that Winterm has so far been used strictly on at the small departmental level

The Gartner analysts say costs savings generated by NCs come from four factors. A total of 47 percent of the savings come from reduced savings in end user operations Another 22 percent of the savings stem from reductions in capital costs 18 percent in cost savings for technical support and 13 percent for reduced expenses in administration. Cappio reported that capital costs encompass 30 to 40 different factors, in areas such as hardware operating system (OS) and applications.

Kerwin says Gartner uses the term administration to refer to factors like "security policies, and day-to-day administration " Technical support, on the other hand, pertains more to matters such as software distribution and user upgrades. The category of end user operations covers casual peer-to-peer technical advice and support, as well as the "futz factor," a term referring to experimentation by individual end uses This experimentation can sometimes lead to "misdiagnosis," according to the analysts

"Users helping each other [can] cause more problems than it solves." The real cost savings on the end user operations side however, will come not from reducing the futz factor but from the "greater productivity" that will arise from placing more software on the server for management by technical professionals, the Gartner analysts said They also suggested that, when viewed in light of these four factors, the results projected for the three different models dovetail well with the higher cost savings expected from thin-client NC-Cs.

NCs, however should be seen not as PC replacements but as PC alternatives Cappio says NCs, he elaborated, are well suited to applications such as point-of-sale (POS) call centres, and mail functions, but not as "like for like" when viewed in relation to full fledged PCs. ☐

Contact: Gartner Group,
Web site http://www.gartner.com

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CLASSIFIEDS

ADVERTISING IS FREE FOR INDIVIDUALS. For business, classifieds are $7 per line (40 characters). Send in your ad along with your payment for the April issue by Friday, February 21, 1997. Individuals: to qualify for a free ad, the ad must be for a one-of-a-kind item. Free ads qualify for one month in the local edition only. All other ads classify as business ads and are subject to the $7 per line charge. *The Computer Paper* reserves the right not to print submissions.

EMPLOYMENT WANTED

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SERVICES

Pacific Notes User Group (PacNUG) - meets last Wednesday of every month except Aug. and Dec. at 5:15 at IBM 8th floor. For more information please contact Delores Bauer at 588-2141 or dbauer@ca.ibm.com

Raymond Kam's Vancouver VRnews2 portal cal-raymondk/SpiderMovies.html QuickTime VR (360-degree) movies of Vancouver

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CALENDAR

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Computer Fest. February 14-16 1997 (Fri 10am-9pm Sat&Sun 10am-6pm) at Automotive Building Exhibition Place Toronto Ontario

Mac Expo- February 14-16, 1997 (Fri 10am-9pm Sat&Sun 10am-6pm) at Automotive Building, Exhibition Place Toronto Ontario. For more information contact David Carter 416 825-4533 or Allan Craighead. Info line 416 324 -0706. Show Fest Productions Inc. 60 St.Clair Avenue West Suite 3 Toronto, Ontario M4V 1M7 Fax: 416-965 7701 Web Page www.compfest.com

Global Communications Congress & Exhibition from February 24-27 1997. To register Mail INTER COMM97 2500-1177 West Hastings Street, Van BC Canada V6E 2K3 Fax: 1-604-6825780 Internet: http://www.intercomm97.com Phone 1 604-689-1900

Independent Computer Consultants Association of British Columbia Suite 720-999 W Broadway Vancouver BC V5Z 1K5 DINNER MEETING on Web Feb 28th 1997 Guest speaker from BC Tel speaking about Web newest (frac services/ISDN,ADSL, etc). For more information & reservation call 734-2747 or browse http://www.icca-bc.org/icca/events.htm

MARCH

COMPUCHANGE COMPUTER SHOW March 16th 1997 10am-4pm at the Firefighters Club 6515 Bonsor Avenue Burnaby. Table rental 8ft for $29 or 8ft for $39(PST included) private individuals can rent a portion of a table to sell a computer system for only $10. For enquires, phone Kimberley at 438-1064 or 438-6114 evenings & weekends; day of the show phone 816-7731

Annual Software practitioners Conference at Delta Vancouver Airport Hotel &Marina, Richmond BC. March 24 1997 First Seminars-proven tools, techniques and the methods used to develop software for the internet. March 25 1997 Keynote address, presentations lunch,panel discussion and reception. Keynote speaker Martin Hauberli Director of Technology,Netscape. Please contact Joan Stoll phone: 604-662 8181ext 190 or email jocs@spc.ca for more information

Independent Computer Consultants Association of British Columbia Suite 720-999 W Broadway Vancouver BC V5Z 1K5 DINNER MEETING Tuesday March 25th,1997 Guest speaker TBA. For more information & reservations call 734 2747 or browse http://www.icca-bc.org/icca/events.htm *

APRIL

Pearson Expositions & Conferences NET COM CARAVAN'97 on Tuesday April 8,1997 from 10am-5pm at the Vancouver Trade and Convention Center 999 Canada Place. For more information phone. 416-821-8138 fax 416-497 9427 Web Site http://www.netcon.pearson.com

Independent Computer Consultants Association of British Columbia. Suite 720-999 W Broadway Vancouver BC V5Z 1K5 DINNER MEETING Wednesday April 30 1997 Guest speaker TBA. For more information & reservations call 734-2747 or browse http://www.icca-bc.org/icca/events.htm *

MAY

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Inside British politics

• NB—An important page for British Internet users to access is the "Politics UK" site. This includes an updated list of business donors to UK political parties—who gives what to whom. Three years of data about donors to the UK parties is online

Web site: http://users.powernet.co.uk/hack/sleaze/

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Flights of fancy

Continued from page **103**

detail. Would you like the weather to suddenly and arbitrarily change during the trip? What about turning off the guys talking to you from the tower? What about a little acrobatic flying? Hey I broke laws! And by the way what is wrong with taking a commercial jet underneath the Golden Gate Bridge, anyway?

There are a million little things that could be covered here such as the very realistic control panels and the ability to replay your flight from various viewpoints, or using the Flight Analysis to understand your take off or landing However perhaps the best thing is to hear it from someone who knows more about flight and simulators instead of computers and words

"Of course, there is no comparison to a real simulator but for what it does I liked it The overall effect is somewhat like real flight somewhat but the keyboard is a very poor device for operating an airplane I did have some difficulty figuring out how to do things that I do automatically in a real aircraft. I would say a joystick is essential Otherwise it is a decent program and would give a new learner a little understanding of the basic rules that govern flight and navigation," notes Quakenbush

Flight Simulator for Windows 95 is a good program and only getting better Clear skies! ❑

Contact: Microsoft Canada 300-90 Matheson Blvd W Mississauga ON L5R 3R3
Web site http //www microsoft com

Free scripts for programmers • NB—If you own a Web page and have the capability to run scripts, you'll be interested to know about this new site. It contains free Perl and CGI Scripts that you can download and use on your own page Four scripts currently available include a logger that allows you to catch data from users, a poller that allows a polling or voting page to be established a hidden counter, and a mail library package that allow email to be added to a CGI program

Web site: http://www.jwpc.com/scripts/

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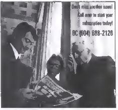

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USER GROUPS

ATTENTION USER GROUPS: Send in your listing (maximum 130 characters) for the April issue by Friday, February 21, 1997. Submissions run for one month only in the local edition. *The Computer Paper* reserves the right not to print submissions which are deemed unsuitable.

ACM/SIGGRAPH Computer Graphics: 2nd Tuesday, at 420 Homer St. Call Tom Berryhill at 734-3876.

ADAM OWNERS! Vancouver Island Senior ADAMphiles (Vast) newsletter, meetings, supplies. Contact David Cobley #17 386 Berwick Rd. Qualicum Beach BC V9K 1N7 (604) 752-1804

ALT.2000 VANCOUVER USER GROUP Meetings are 1st Friday of each month at Pacific Center Mall by payphones in food court, north of Dunsmuir at Granville 4pm to 9pm. Starts early to catch the evening shift 2600ers. For more information contact Steve via email at <sage@vanbc.wimsey.com> or <sage@rainbow.deecon.com>

AMIGA USER GROUP (PaMarAmA) For meeting times and place call: Ray Norman 588-7189 or Robert Hardy 942-6304. BBS numbers 231-8063 or 231-8364

APPLES B.C. COMPUTER SOCIETY A User Group for Macintosh and Apple IIs. Macintosh meetings are on 3rd Wednesday of each month at the York House School in Vancouver at 7 p.m. Novice and other special-interest groups are held mid-month. Apple II meetings are on 1st Monday of each month at 7 p.m. at the Century House in New Westminster. For further information call 437-0885 or 298-5697

ATARI USERS! Vantari: P.O. Box 3614 Main Post Office, Vancouver BC V6B 3Y6, the Sutherland 588-1466; Dan Hatch 433-8866. Meets 2nd Wednesday 7:30 p.m. Hastings Centre Cr. 3096 E. Hastings.

B.C. EDI USER GROUP For more information call 532-8834 (general), or store mail 532-8219

B.C. INTERGRAPH USERS GROUP (BCIUG) Contact: Mike Barnes 520-1836 (voice) or 588-2944 (fax) for info on next meeting.

B.C. OPENSTEP GROUP Regular monthly meetings focus on various themes, for single users, corporate users and developers in the Vancouver area. NeXTStep and Open Step are the preferred platform for rapid development. For meeting information and email server call Kevin Hiebert at 264-1584 or <khiebert@wimsey.com>

B.C. REGIONAL USERS GROUP SOCIETY of Hewlett-Packard Users. For information, call Daren Stetchuk at 861-8753 or BCRUG at 861-8848.

B.C. VAX/VMS Local Users Group (BCVAXLUG) provides a forum for the professional growth and education of its members through the meetings of solutions, ideas, and opinions. User group meetings are held the 3rd Wednesday of every other month at 6:30 p.m. with location to be advised. For further info please call voicemail 276-0806.

BIG BLUE AND COUSINS, PO Box 5388, Station B, Victoria BC V8R 6S4. General meeting last Wednesday 7:30 p.m. at U Vic - Elliott Bldg. Lecture Theatre 168. Also special interest group meetings. 388-3934

CANADIAN INTERGRAPH USERS GROUP CONFERENCE, September 8-11, 1996. Delta Meadowvale, Mississauga ON. "Drive The Open Road". Contact Laura Bonmen, Intergraph, 2912 Memorial Dr SE, Calgary AB T2A 7R9. Voice (403) 569-5562. Fax (403) 569-5801 e-mail: @ccmail.ingr.com

CANADIANS ON COMPUSERVE Canadians around the world and anyone interested in things Canadian are joining the Canadian Issues section of The Issues forum on CompuServe. Lively discussions center around politics, society, customs and conflicts. Plus, there's a growing library of Canadian files. Go Issues at any CompuServe prompt. Dial 1-800-848-8199 for more info.

CIPS VANCOUVER SECTION, (Canada's largest Association for Computer Professionals). CIPS Members enjoy unparalleled networking and professional development opportunities at our monthly meetings and special events. Discounts offered for student members. PO Box 20572, Howe St. Vancouver BC V6Z 2N8. Phone (604) 681-2796 or Fax (604) 689-1879 for next meeting date.

CONSULTANT USER GROUP (Associated with the Vancouver PC User Group). Educates consultants. Sharing of more Business side of being a consultant. Meetings are the 3rd Thursday of the month, at the Oakridge Library Meeting Room 191, 650 W 41st Ave, Vancouver. Southwest corner of the mall next to the Valetor Cleaners. 5:30pm. Free. For further information call: Nitch Nel 432-6654 or syv@informatch.com

COREL ARTISTS USER GROUP Last Tuesday of every month: 7:00 to 10:00 pm at Kwantlen College in Richmond BC. Monthly newsletter. Contact: Bev Harcus: 533-5664

DATA-LINK/USERS GROUP 1st 321-3387. PC support BBS: 321-8073 (24 hr service) with specialized self-made BBS software. The purpose of this User group is to allow users to get together for problem solving, discussion of setup and to meet people. Call by voice 6 a.m.-4:30 p.m. ONLY please. This group is dedicated to RoboBOARD by Seth Hamilton. Other BBS software are welcome. Membership is free!

FOXSOFT EDMONTON'S FOXPRO USERS GROUP-second Tuesday, 7:00 pm. Grant MacEwan City Centre Campus, East Wing, Room C-137/C 136, 10700-104th Ave. Contact: Ken Rayner at 437-8315 or Room Stuart at 460-3712 (days). Info Bulletins on BBS 457-4105

GENERIC CADD USERS GROUP Contact: Frank Zander (604) 502-8283 BBS: 294-8897 (9600 n 8,1)

HELP DESK INSTITUTE LOCAL CHAPTER. An organization providing training, education and a networking forum for Help Desk Professionals. Those people who help computer users with hardware or software problems. For more information on membership, please call Karen Yuen at 631-6086.

INDEPENDENT COMPUTER CONSULTANTS ASSOCIATION OF BC The ICCA is a non-profit association of consultants who provide services in the field of Information Technology. The objectives of the ICCA are to provide a forum where consultants can network with each other, exchange ideas, and improve their business and computer skills. Monthly meetings with speakers. For further information contact us at: Suite730-999 W Broadway, Vancouver BC V5Z 1K5 Tel:(604) 734 2747 Fax: (604) 734 2787 or E-Mail icca@indlink.bc.ca WWW http://www.icca-bc.org/icca/

LOTUS NOTES: see "Pacific Notes User Group"

MACWEST COMPUTER SOCIETY Meetings for veterans and newbies include PD copy sessions. General meetings: 2nd Wednesday of each month. Beginner's meetings: 3rd Wednesday of each month, 7:30 p.m. Guildford Public Library, Surrey. Messages and information at 380-8536.

MS ACCESS TECHNICAL USER'S GROUP For those who want to participate in learning more about MS Access. For information call Greg Hind at 454-0052, from 9:00 to 5:00.

NANUGS (Northern Alberta Novell Users Group Society) meets quarterly at the CompuSmart store on Mayfield Road. For information, please e-mail to nanugs@freenet.edmonton.ab.ca or phone Mike Brown (403)487 7866.

OBJECTS USER SOCIETY: See British Columbia OpenStep Group (B.C.O.G.)

OPENSTEP USER SOCIETY (VNUG), See British Columbia OpenStep Group (B.C.O.G.)

PACIFIC NOTES USER GROUP (PACNUG) - Lotus Notes users meet the last Wednesday of each month. 5:15pm at Nelson's on Robson on July 31st. Contact: Delores Geler at 988-2141 or delores-j@bownda.com

PC/MAC USER GROUP: Wanted Professional Photography/Graphic Designers to share, network and learn the more hardware and software programs available. Starting May 7th we will meet at 7:00pm every 1st and 3rd Tuesday of the month, at Intera Computer Center, #205-1936 W 5th Ave. If you are interested please contact: B. Hanington at either 873-6815 or raam@mindlink.bc.ca for further info.

PORT COQUITLAM COMPUTER CLUB: Commodore, Amiga, IBM-Mac. 1st & 3rd Tuesday, 7:30 p.m. Room 8 Minnekhada Middle School, 1390 Laurier Ave., Port Coquitlam. Ed Dyer-Pubberty at 942-0064

POWER BUILDER: User group being formed. Meetings are planned for first Wednesday. To enroll call Perform System Developers at voice mail 604 264-0847

SQL SERVER: User group being formed: meetings are planned for first Monday. To enroll call Perform System Developers at voice mail 604 264-0847

T.I. 99/4A COMPUTER B.C. 99er Users Group, every Thursday 7-10 p.m. For information, call Ron: 522-2598. 1st Thursday Tutorials, 2nd Thursday General, 3rd Thursday tutorials, 4th Thursday Library night. BBS "Dial A T.I." 522-9838. TI only please!

TEENS IN VANCOUVER USER GROUP For teens under the age of 18 interested in doing computer related projects regularly. WWW, programming, games, anything! The main goal is to share computer knowledge and to make friends. If there are any homeschoolers interested, that would be great. If interested, please call Grant Mak at 926-7835.

THE TOPKIDS CLUB: A user group for kids, Teens and parents. Monthly meetings are family focused with software/hardware demonstrations, guest speakers, Windows and Mac tips and online demonstrations. A BBS is available to members. Call Garland Coulson 279-8438 or e-mail garland_coulson@topkids.com

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7:30 p.m. B.C.I.T. Bby Campus Bldg. SW5 Room 1856. Contact Frank Zander (604) 662-8263

VANCOUVER DELPHI DEVELOPERS ASSOCIATION meets once a month at the Vancouver Public Library (downtown). The meeting is usually on the 2nd or 3rd week of the month on Tue or Wed depending on availability of facilities. The purpose of the group is to provide a common and regular forum for Delphi developers to get together and discuss Delphi related issues. $10 admission to cover rental of room. All meeting notices are sent via fax or email. To add your name to our distribution list, send company name, address info, phone, fax and e-mail to Michael Li at 75307.722@compuserve.com or fax (604) 432-1798 or at (604) 432-1709.

VANCOUVER ENTERPRISE FORUM 436-8761

VANCOUVER FOXPRO USER GROUP (VFUG) September-June, 2nd Tuesday, at 1900 hours, 200-1177 W. Broadway. Info Doug at 738-2022, BBS 231-9709 and e-mail to psytan@uniserve.com

VANCOUVER GEOWORKS USERS CLUB. For further info please call 683-7490 (eves)

VANCOUVER GEOGRAPHIC INFORMATION SYSTEMS USER GROUP. Meetings are held on the 1st Wednesday of each month, September through May, at B.C.I.T. Town Square Room C at 7:30pm. Contact Dwight at 946-1518 for information.

VANCOUVER KAYPRO USERS GROUP-VANCOUVER PORTABLE COMPUTER CLUB (VPCC). AMO 17 friendly members, heritage CP/M software, the latest DOS and Windows files, plus freeware and access to the planetwide Fidonet! Visitors welcome to our BBS. Contact person: Jay Siegel, 4251 Lancelot Dr. Richmond, B.C., V7C 4S4. 271-1819; BBS 271-6934

VANCOUVER MACINTOSH USER GROUP (VMUG). Vancouver's newest Macintosh Users Group, serves Mac users in the Vancouver, North Shore and Burnaby areas. Everyone is welcome, regardless of experience. Visit our Web Site at http://www.bearcom.com/vmug, sign up online, or call 988-6090 or email sking@direct.ca for more info.

VANCOUVER NETWARE USERS GROUP (VNUG) is an official user group recognized by the Netware Users International Assoc. and supported in part by Novell. Meetings are held on the first Business Monday of every month at The Stanley Park Dining Pavilion. All aspects of the networking environment are discussed and presented with emphasis on the Netware network operating system. The workshop begins at 4:00p.m., buffet dinner at 6:00pm; at 7:00pm is a Q&A session followed by a presentation ending at around 8:30pm. Member, non-member and student pricing applies to the workshop and/or dinner-presentation. For further information or meeting topic announcements call our voice mail at 688-VNUG (688-8684).

VANCOUVER OS/2 USER GROUP. Attended by OS/2 gurus and novices alike and well supported by IBM. The large and lively meeting is held on the first Wednesday of each month at the BC Tel Building, 3777 Kingsway, Burnaby and starts at 6:45 pm. Join us for an informal workshop beginning at 11:30 am on the first and third Saturdays of each month at Doppler Computer Superstores, 485 W. 8th Ave., Vancouver. Contact: Jim Shewchuk 876-4796.

VANCOUVER PC USERS SOCIETY (VPCUS). 2nd Thursday, 7pm at Science World. $5 guest admission. General Q&A session, feature presentation, Special Interest Groups (see also separate listings) and educational seminar registration. On-disk newsletter. Telephone: 290-0669

VANCOUVER SMALLTALK USERS GROUP (VSMUG) is a group of individuals and organizations interested in object-oriented analysis, design and programming with a particular emphasis on Smalltalk. Primarily for individual developers to meet, share ideas and experiences, discuss technical issues and learn cool stuff. It's designed not to be a forum for sales pitches from vendors. RSVP VSMUG@cs.UBC.CA or visit our web site at http://lucy.iasc.uvic.ca/~hrh

VANCOUVER WINDOWS NT USERS GROUP (VANTUG) is a forum for both developers and administrators interested in sharing their NT experience with their peers. Meetings are held every two months at the Justice Institute of BC (JIBC) in New Westminster. For more information contact Glen Houghton at ghoughton@jibc.org or at (604) 528-5661

VISUAL BASIC PROGRAMMERS GRO Contact Johann at johannw@intergate.bc.ca

VISUAL OBJECT DEVELOPERS ASSOCIATION OF VANCOUVER. For information on our next meeting contact John Kriewasser (604) 430-8210 fax: (604) 481-3848 CIS 72120,3156

VPCUS Clarion SIG — Clarion is a full-featured DOS & Windows application development platform. This current dark horse of software development tools will soon be acknowledged and acclaimed as a world class star, attracting market share and attention. Clarion uses a superior high level language that can be template driven and/or hand coded to produce stand-alone EXE files that are ROYALTY FREE. Check out the excitement. This lively SIG attracts a range of participants from seasoned professional programmers to new users and the curious. Meets second Tuesday of month at 7pm at IT Training Group Ltd offices 888 Dunsmuir. Contact John Bailey 736-7762

VPCUS DBUG (Data Base Users Group). Emphasis is on solving problems of data management with special reference to Paradox. Bring a blank 3.5 inch disk to pick up goodies from the meeting. Meeting on the 3rd Monday of the month at 7pm at Dreka Computer Training offices, 888 Dunsmuir. Contact Brad Franse 938-3093

VPCUS Educational Seminars — Members $5, Non-members $15. Various topics, times and dates. Contact Glenda Ellwood 737-0674

VPCUS HTML SIG-Want to learn how to create a home page on the web? Do you want to share your expertise? HTML SIG meets the 2nd Tuesday of each month at IT Training Group Ltd offices, 888 Dunsmuir 3rd floor @ 7pm. For more information contact Brenda.Delaney@UBC.ca or Virginia@Arts.UBC.ca

VPCUS Internet SIG Meets last Wednesday of month, 7pm at 1129 Main Street. Contact Jon Thompson at Dynshaw@Wimsey.com

VPCUS LINUX SIG-Meets 3rd Monday of each month at 7:00pm 3rd fl 888 Dunsmuir at IT Training Group Ltd offices. For further information please call Stan Claussen 581-6814 or sclaussen@direct.ca

VPCUS Novell Network SIG. This is the place for you if you are a network administrator with Novell glory stories and tips to share, or if you just want to get together with other Novell users to explore its ins-and-outs. Contact Brenda Delaney 224-2143

VPCUS MICROSOFT OFFICE SIG. The place to come if you are a user of any of the Microsoft office Pro products and want to learn more and share your tips. Meetings are held on the 3rd Monday of each month at IT Training Group Ltd offices for more details call Joanne Maclaren 421-1283 before 9 p.m.

VPCUS Windows/C++. For programmers and intermediate-to-expert Windows users who are interested in C, Access, Visual Basic. Meets second Tuesday of month at 7pm at IT Training Group Ltd offices, 888 Dunsmuir. Contact Casey Hawthorne 879-2783 or caseyh@wimsey.com

VPCUS WordPerfect SIG. Participants share tips and more, occasional presentations by WordPerfect Corp. Meets second Tuesday of month at IT Training Group Ltd offices, 888 Dunsmuir, 3rd floor 7:00 pm. Contact Holly Rivers 731-8088

WINDOWS NT User group being formed. Meetings are planned for first Saturday. To enroll call Perform System Developers at voice mail 604-264-6647

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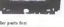

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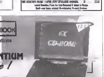

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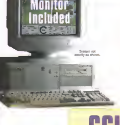

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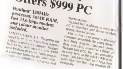

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Delta / Surrey	Strider Computers	604 543 4200	Williams Lake	Information Mgt. Service	604.392 4675

[illegible]